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ABSTRACT

This two-volume guide presents ingredients for developing a culturally relevant curriculum for American Indian students in the primary grades. A survey of Indian literature for young children yielded eight topic areas included here. The suggested approach to curriculum development is the integration of reading, language arts, math, and science based upon the Indian literature and other resources. Materials and activities are aligned with challenging content standards. Also included are ideas for art activities and promotion of tribal values. Indian studies classes and regular classes should be coordinated around the topic area so that Native language and cultural activities complement classroom instruction. The topic also provides a context for language instruction. Activities for parents and tutors are included as part of a comprehensive approach. The guide begins with descriptions of the roles of administrators, parents and tutors, and teachers and aides in creating a sacred place for learning. The eight units in these two volumes cover birds; sun, moon, and stars; food; beavers to buffalo; hares to horses; art; earth, air, water, and fire; and music and dance. Each 4-week unit contains background information on the topic, a suggested outline for formulating activities from American Indian literature, information about the suggested literature, further resources on the topic, a vocabulary list, content standards, example activities developed by teachers of Indian children, pages for teacher ideas and lesson plans, and nursery rhymes and poetry. A final section of the guide lists additional resources and where to get books. (SV)

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Creating a Sacred Place To Support Young American Indian and Other Learners in Grade K-3. Volume I. 2nd Edition [and] Volume II.

Sandra J. Fox

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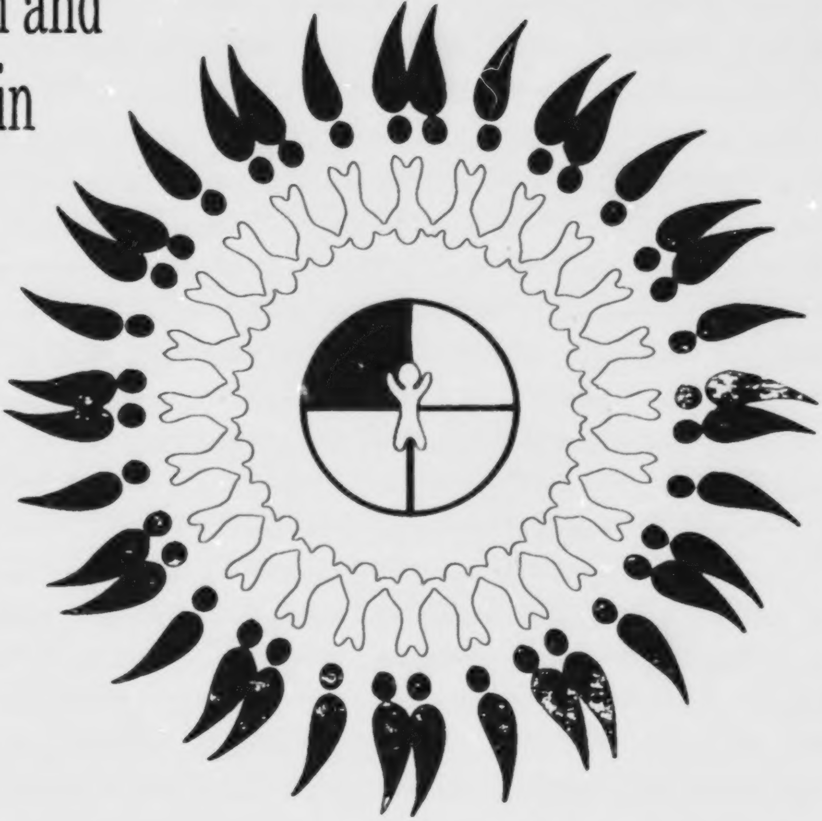
Creating a Sacred Place to Support Young American Indian and Other Learners in Grades K-3

Volume 1



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by

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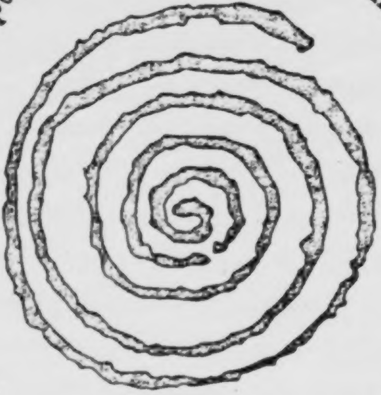
2nd Edition

Creating a Sacred Place to Support Young American Indian and Other Learners in Grades K-3



Volume 1

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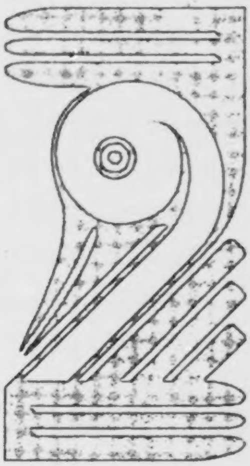

Materials & Activities for

Birds
Sun, Moon & Stars
Food
Beavers to Buffalo

Units

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This book is dedicated to Dean P. Fox, Good Eagle,
(1954-1999)
who believed in creating a sacred place.

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Mandan/Hidatsa/Arikara/Lakota

Contents

Introduction i

Creating a Sacred Place – Administrators and School Board Members 1

Creating a Sacred Place – Parents and Tutors 3

Creating a Sacred Place – Teachers and Aides 5

Materials and Activities for Birds Unit 11
- *Background Information for Teachers and Parents* 12
- *Suggested Primary Level Unit Outline* 14
- *About the Literature* 16
- *Further Resources for Birds Unit* 20
- *Bird Words* 23
- *Science, Math and Language Arts Standards* 24
- *Activities Developed by Teachers of Indian Students* 27
- *My Ideas for Birds Unit* 45
- *Lesson Plans/Schedule for Birds Unit* 46
- *Nursery Rhymes and Poetry* 48

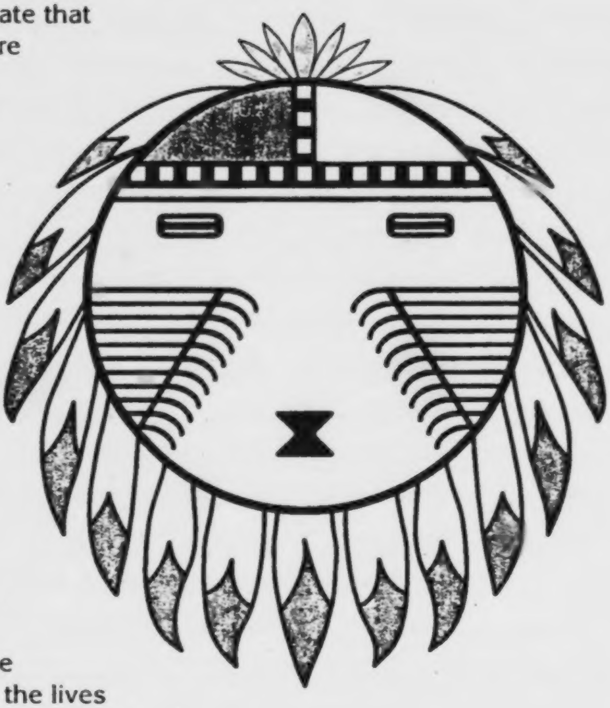
Materials and Activities for Sun, Moon and Stars Unit 49
- *Background Information for Teachers and Parents* 50
- *Suggested Primary Level Unit Outline* 52
- *About the Literature* 54
- *Further Resources for Sun, Moon and Stars Unit* 59
- *Sun, Moon and Star Words* 63
- *Science, Math and Language Arts Standards* 64
- *Activities Developed by Teachers of Indian Students* 67
- *My Ideas for Sun, Moon and Stars Unit* 95
- *Lesson Plans/Schedule for Sun, Moon and Stars Unit* 96
- *Nursery Rhymes and Poetry* 98

  Nursery Rhymes and Poetry 98
Materials and Activities for Food Unit 99
  Background Information for Teachers and Parents 100
  Suggested Primary Level Unit Outline 102
  About the Literature 104
  Further Resources for Food Unit 108
  Food Words 110
  Science, Math and Language Arts Standards 111
  Activities Developed by Teachers of Indian Students 115
  My Ideas for Food Unit 143
  Lesson Plans/Schedule for Food Unit 144
  Nursery Rhymes and Poetry 146

Materials and Activities for Beavers to Buffalo Unit 147
  Background Information for Teachers and Parents 148
  Suggested Primary Level Unit Outline 150
  About the Literature 152
  Further Resources for Beavers to Buffalo Unit 156
  Beavers to Buffalo Words 159
  Science, Math and Language Arts Standards 160
  Activities Developed by Teachers of Indian Students 165
  My Ideas for Beavers to Buffalo Unit 184
  Lesson Plans/Schedule for Beavers to Buffalo Unit 186
  Nursery Rhymes and Poetry 188

Additional Resources 189
  Indian ABC Books 189
  Where to Get Books 189
  Books Available from the Haskell Foundation 190
  Science Organizations and Projects 191
  Teacher Resources 191
  Social Studies Books for K-3 192
  Outline for Developing Your Own Units 194

Introduction



As we enter the next millennium, it is unfortunate that American Indian students, for the most part, are still not doing as well in school as they might. At the 1999 conference of the National Indian Education Association, I gave the banquet speech in which I said that we had failed because we still did not have the relevant curriculum for Indian students that we had talked about for at least the 30 years I had been involved. After stating that, I felt obligated to be a part of the solution. My doctorate is in curriculum and instruction with an emphasis in the teaching of reading.

In my 30+ years in Indian education, I witnessed many classrooms in which students were totally disengaged. The instruction taking place was either boring or the topic was totally unrelated to anything the students knew or cared about. The relevant curriculum we had envisioned took place in the regular classroom, included content related to the lives of Indian children, made them proud, expanded to other experiences, and enhanced further learning. American Indians had highly developed societies before the white man came and have contributed much to this society. I read recently that NASA is looking to Indian people to help solve the global warming problem. Indian children should know these things.

Indian literature is a resource that can provide the basis for a culturally relevant curriculum. More books are being written by Indian authors who preserving our stories that are similar across the country. What I have done is to survey all of the Indian literature available for young children, written by both Indians and non-Indians. It has fallen in eight topic areas, four of which are included in this book. The approach promoted is the integration of reading, language arts, math and science based upon the Indian literature, non-Indian books and topic areas. Materials and activities are aligned with the new, more challenging content standards. Also included are ideas for art activities and promotion of tribal values from the literature. Creative teachers might also include social studies and career education in this integrated approach. Indian studies classes and regular classes are to be coordinated around the topic areas so that native language and cultural activities complement classroom instruction. The topic will provide a context for language instruction and the goal should be conversational language. There are activities for parents and tutors as part of a comprehensive approach. This is not a canned curriculum; it contains all the ingredients necessary for a school to develop its own curriculum for the primary grades with an extension to homes and preschool children.

This document pays tribute to many: Indian and other authors who write books for Indian children, Indian and other organizations that distribute books especially by and about Indians, Indian and other organizations that have made the improvement of math and science instruction a priority, individuals who see the connection between Indian culture and science instruction, and teachers who have developed and then implemented culture-based curriculum in their classrooms. Many good activities have taken place across the country over the years. Many good materials have been developed but now sit on shelves or have disappeared. This attempt draws from some of them and will help to publicize new efforts.

Some of the materials and activities included here have been taken from the work of others. For example, some of the teachers' background information included comes from math and science materials developed by ORBIS Associates of Washington, D.C. The math and science activities included were developed by teachers in Bureau of Indian Affairs-funded schools in summer workshops at Haskell Indian Junior College (Haskell Indian Nations University) in 1992 and 1993. I have drawn on the work of Indian educators such as Richard Nichols, Gwen Shunatona and Michelle Chingwa of ORBIS Associates; and Dan Wildcat, Lucretia Herrin, Dr. Michael Ward, and Anita Chisholm who led the math and science workshops at Haskell. The section, *Additional Resources*, starting on page 191 lists science organizations and projects, teacher resources developed by Indian educators, and Indian book distribution organizations.

I hope that this document will be useful to parents, tutors, teachers, aides, administrators and school board members at schools where there are Indian students. I hope that Indian Education and Johnson O'Malley programs can utilize it. I hope that parents who are homeschooling their children will find it helpful. I hope that teachers of non-Indian students will use it, especially for that week at Thanksgiving, and beyond.

I have not read every book listed in this document, and if I did, I would not be able to guarantee their being free of cultural bias. I did utilize the publication, *Books Without Bias: Through Indian Eyes* by Beverly Slapin and Doris Seale to avoid books that may be offensive. I tried to promote books written by Indian authors. If it is found that a book is not acceptable to Indian people or to a tribe, in particular, the book should definitely not be used. I recommend that books be reviewed by local Indian people to be sure. I have heard varying opinions on this matter and on certain books. I just feel that we need to take a risk and help teachers who want to incorporate a more meaningful curriculum, but do not have the time or the information to do so. Actually, if the use of the approach outlined in this document works, it should promote a resurgence of local storytelling and/or the writing of more children's books by Indian people.

Anyway, I hope that this document will help little children somewhere. I greatly enjoyed developing it. I hope others will enjoy using it to create a sacred place for young American Indian and other learners.

Sandra J. Fox, D. Ed.
Oglala Lakota
Albuquerque, New Mexico

Creating a Sacred Place – Administrators/ School Boards

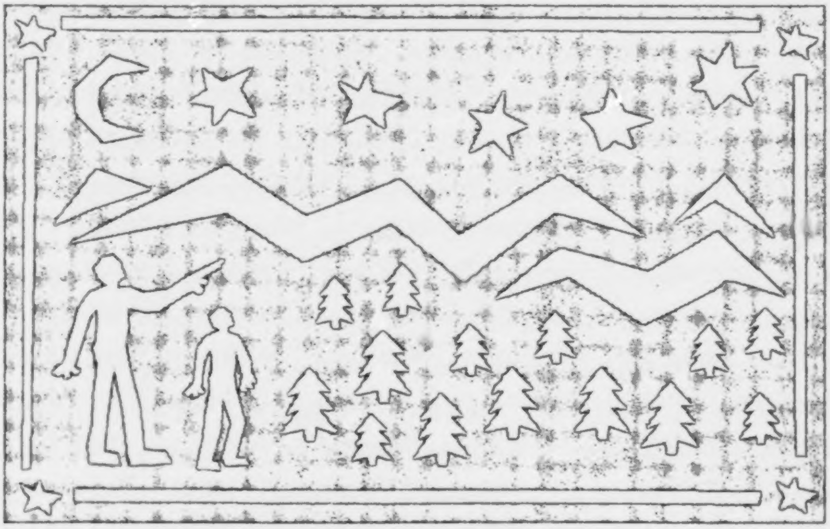
Consider this quote from Ron Edmonds of the Effective Schools movement:

> We can, whenever and wherever we choose, successfully teach all children whose schooling is of interest to us. We already know more than we need to do that. Whether or not we do it must finally depend on how we feel about the fact that we haven't so far.

We are at a time when it is being demanded that schools produce higher achievement. Students must learn to read and write at higher levels, be able to solve more difficult math and science problems, and they must be adequately prepared to meet the world and function successfully in the 21st Century. We must change the way we do things in order to produce these results. Schools have been failing students. Part of the problem is that we don't do what we know should be done, as Ron Edmonds states.

For example, in regard to American Indian students and the teaching of reading, the research has said over and over that two major strategies are recommended: 1) utilize reading material that relates to the lives of the children so they understand that it is experience captured in written language and are interested in reading it, and 2) strengthen and expand the language ability of children by providing a great deal of opportunity to have new experiences, learn new words and practice oral language in English and the native language.

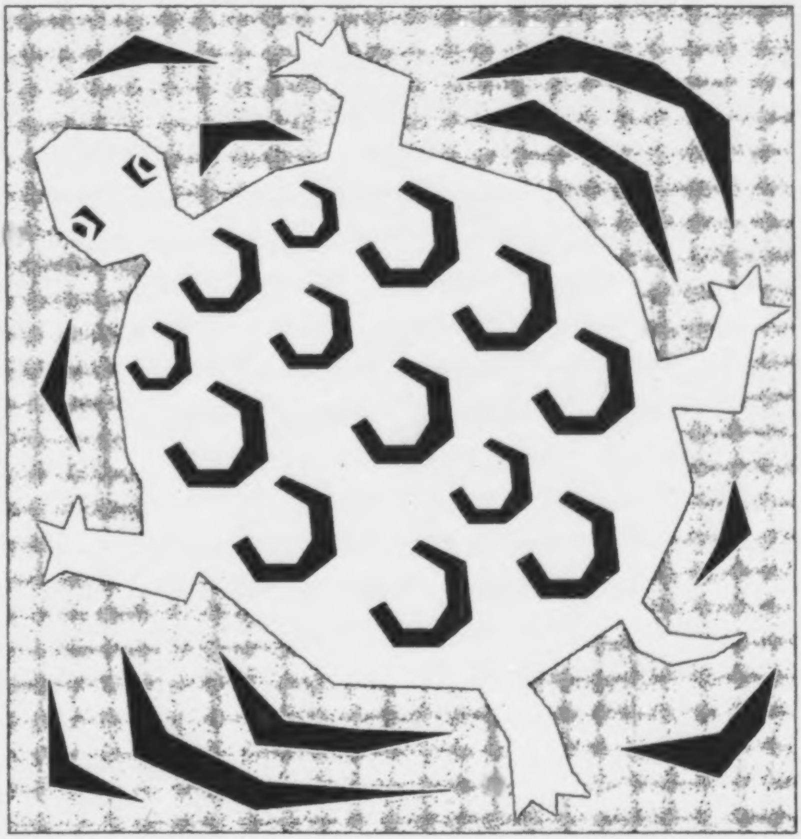
For the most part, these two recommendations are not followed in schools that have American Indian students. Why not? Most reading instruction is done with reading books that seldom contain stories that relate to the lives of the children, and experience-based instruction and oral language practice require a great deal of work and make a noisy classroom which schools don't usually tolerate. Another part of the problem is that schools and teachers have many, many things to do in a day. They have so many things to do that, often, they don't do them well.



Another piece of information that we should pay attention to is found in a recent report from the U.S. Department of Education that indicates that children from high poverty areas are coming to school with English vocabularies of only about 3,000 words as compared to children from more affluent families that enter school with 20,000 word English vocabularies. Students with 20,000 word vocabularies learn to read and write much easier than those with 3,000 word vocabularies. If a child does not know the words he/she is to read on standardized tests, there is an automatic penalty. Schools that have Indian children must attend to vocabulary expansion by addressing language development in English and the native language.

Still another major consideration is the importance of parental involvement and early childhood education and experiences. Recent research tells us that the first three years of life are extremely important in preparing children for school. Schools must take advantage of this information and plan and implement programs that engage parents in activities with their children that will provide the foundations necessary for further learning when the children go to school.

This document is an attempt to help schools follow the recommendations made to improve the teaching of Indian children, utilize the information from recent research and reports, and help teachers do all the things they are required to do in a more efficient manner. It will primarily help teachers teach reading, language arts and science using American Indian and non-Indian stories and materials. The materials and activities are aligned with the new, more challenging language arts and science content standards required by school reform. At the same time, teachers can teach some math, art and tribal values. Very creative teachers might also include social studies and career education in this integrated approach. This approach provides the opportunity for the Indian studies classes and regular classes to work closely together to reinforce classroom instruction with language and cultural activities. Parents and tutors play an important part. Imagine what can happen if all are working together toward the same goals.



If you are a parent or grandparent, you need to also read the section for parents and tutors. If you want to know more about how the approach suggested by this document would work, read the section for teachers and aides.

Creating a Sacred Place – Parents and Tutors

More than ever before, teachers need the help of parents and tutors who can assist children in a one-on-one situation to give them the practice, support and assistance that they need individually to do well in school. As part of the national school reform effort, schools are being required to expect more from students and teach them more difficult things. For example, now all students are to "become good readers by the end of third grade." This has not happened in the past so this is now a national goal. In order to meet this goal, it will take a joint effort of teachers, parents, and tutors (if available).

What must be done to help our children? A recent report by the U.S. Department of Education indicated that many children are coming to school with English vocabularies of approximately 3,000 words as compared to other children that have English vocabularies of 20,000 words. Students with 20,000 word vocabularies have a much easier time learning to read and write. This tells us that teachers, parents and tutors must provide activities that will help expand children's English vocabularies. Children learn language by hearing and speaking. Strengthening children's native language use helps them learn English easier. Further, it is known that reading to children is the single, most important activity that parents can provide to help their children succeed in school. Here are more things parents and tutors can do:

> Talk more with children about school and everyday things. Have them recite poetry, sing songs, present various things they have learned. Play with them.
>
> Tell stories and read to children often. Ask them questions as you read to see if they are understanding the stories. Occasionally, have them retell the story or draw a picture about it.
>
> Teach children to be interested in words, how they are spelled, what they mean, and teach them new words. Have them write lists and short notes for you.
>
> As children learn to read, have them read to you – either the whole story, some of the pages, or pages after you have read them already. Ask them what they think about what happened in the story.
>
> Be actively involved in the children's school instructional program. Provide support for their learning and make available interesting and meaningful reading and other educational materials and activities for them.
>
> Be a role model and let the children see you reading and writing. Limit television watching in favor of time for reading and reading together.

The activities listed above should be done with children starting at birth, by talking and singing to them a lot in both English and the native language, and should be continued all the way through their primary school years and beyond.

This document contains lists of books that you and your children will enjoy. The books include stories and information about birds; the sun, moon and stars; food; and animals. The books include Indian stories that usually teach lessons and regular non-Indian books for young children. This document also contains word lists (pages 23, 63, 110, 159) that parents can use for each of the topics and background information for parents on the topics (pages 12, 50, 100, 148). The lists of books are found in the sections entitled *Further Resources* and *About the Literature*. The books are categorized as follows:

Phase 1: Awareness and Exploration
Children explore their surroundings, building foundations for learning to read and write. This starts at birth and continues through preschool.

The activities listed on the previous page are good ways to help your children build foundations for learning to read and write. Books that are most appropriate for Phase 1 children are found on the *Further Resources* lists (starting on pages 20, 59, 108, and 156) and are marked in italics. Books listed in the *About the Literature* sections for Phase 2 (pages 19, 58, 107, and 155) would also be good to read to preschoolers. The section *Additional Resources* at the end of this book contains a list of Indian ABC books. Your school or community library has picture books for preschoolers on the topics included in this book and other topics. Also, check bookstores and other stores. Pages 48, 98, 146 and 188 contain nursery rhymes and poetry.

The other phases are:

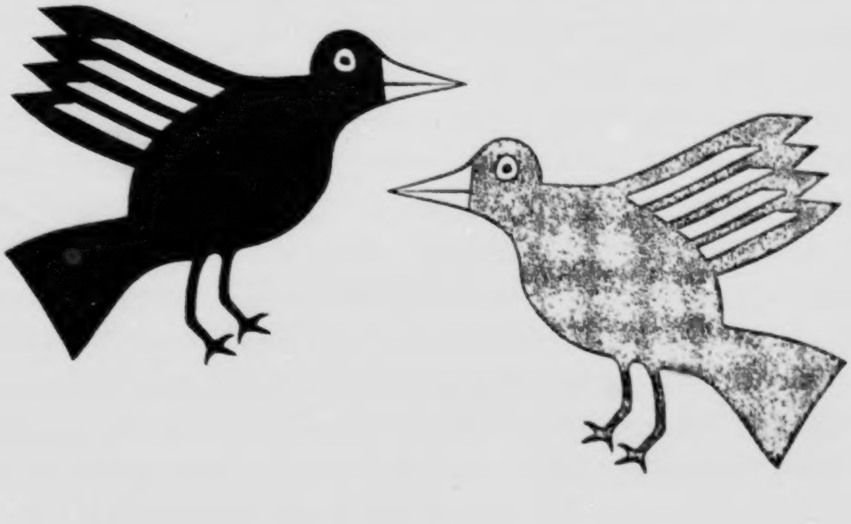
Phase 2: Experimental Reading and Writing
Children develop the basic concepts of print and begin to experiment with reading and writing. This is what they are to learn in kindergarten.

Phase 3: Early Reading and Writing
Children read simple stories and write about meaningful topics. This is what they are to learn in first grade.

Phase 4: Transitional Reading and Writing
Children begin to read more fluently and write using more complex sentences. This is what they are to learn in second grade.

Phase 5: Independent and Productive Reading and Writing
Children are capable readers and continue to refine reading and writing. This is where they should be by the end of third grade.

Based on these phases, parents and tutors can choose books from the various lists in this document in the sections called *About the Literature* or from the *Further Resources* lists, especially if they are interested in materials from certain tribes or particular aspects of a topic. Also included are pages for parents or tutors to use to schedule and log reading time with children if there's room. Some parents may be homeschooling their children, in which case, they should also read the section for teachers and aides.



Creating a Sacred Place – Teachers and Aides

Schools are involved in various school reform activities at this time. Teachers of the primary grades are being asked to do many things including:

- align curriculum with the new content standards and new assessments,
- do a better job of teaching reading and math,
- utilize an integrated approach to teaching the various content areas,
- teach for understanding and application and focus on depth,
- teach disabled and gifted students in the regular classroom,
- promote positive student behavior through a school-wide approach, and
- provide meaningful parental involvement in the instructional process.

In addition, teachers of American Indian students are asked to:

- incorporate American Indian content standards,
- provide instruction for Indian children that is based upon research,
- provide culturally relevant instruction within the regular classroom, and
- promote the use of native languages to strengthen children's language ability.

This is only a partial list of the many things that teachers of primary students have to do. This document will provide assistance to teachers and aides who truly want to create a sacred place to support young American Indian or other learners and will help coordinate all that they have to do.

Essentially, the approach presented here combines the teaching of reading, language arts, math and science by utilizing American Indian and other literature as the basis for instruction. The materials and activities are aligned with the new, more challenging language arts, math and science standards and the American Indian content standards. Teachers can also teach art and tribal values in relation to the topic and the literature. Some teachers might also include social studies and career education in this integrated approach. The approach provides the opportunity for Indian studies classes and regular classes to work closely together to directly reinforce classroom instruction with language and cultural activities. Parents and tutors also have important parts to play.

A primary purpose of this effort is to help teachers do a better job of teaching Indian children to read. In order to meet the national goal of having all students be capable readers by the end of third grade, we must utilize all resources and all information available. A recent publication of the U.S. Department of Education, *Start Early, Finish Strong: How to Help Every Child Become A Reader*, includes the various phases in learning to read, what should be learned at the various grade levels and before.

Phase 1: Preschool – Awareness and Exploration
Children explore their environment, building foundations for learning to read and write.

Phase 2: Kindergarten – Experimental Reading and Writing
Children develop the basic concepts of print and begin to experiment with reading and writing.

Phase 3: First Grade – Early Reading and Writing
Children read simple stories and write about meaningful topics.

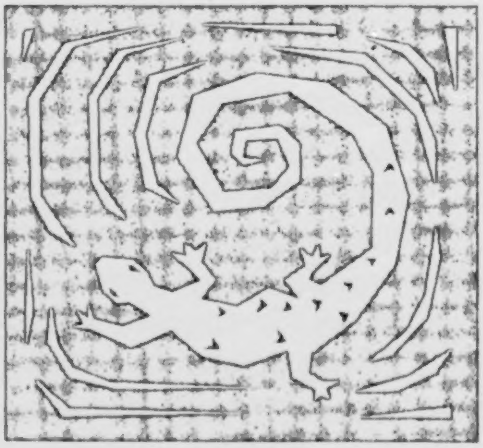
Phase 4: Second Grade – Transitional Reading and Writing
Children begin to read more fluently and write using more complex sentences.

Phase 5: Third Grade – Independent and Productive Reading and Writing
Children continue to refine reading and writing for different uses and audiences.

The materials and activities presented in this document are organized generally according to these phases, although students at various phases within a classroom can be accommodated because the topics for phases are assigned according to student interest level and include various reading levels of materials. Ungraded or multi-age classrooms can also be accommodated and are encouraged.

The *Start Early, Finish Strong* document also indicates that children of low-income families come to school with an English vocabulary of approximately 3,000 words, whereas a child from a high-income family has an English vocabulary of 20,000 words. The child with a 20,000 word English vocabulary has a much easier time learning to read and write. If children do not know the words they are to read, there is an automatic penalty when they take standardized tests. Vocabulary building and language development are key.

Start Early, Finish Strong states that teachers need to use a comprehensive approach to teaching reading and teach young children that language, in a meaningful context, is made up of words which contain sounds that are represented by letters and groups of letters. Presently, however, too many teachers think that phonics instruction will solve all their problems. Phonics rules do not apply to many words. Therefore, meaning and a rich vocabulary are necessary for children to recognize words for which phonics rules do not apply. Children need new experiences to learn new words; often this new experience comes from reading and words are recognized within context while reading.



Over the years, research regarding improving the teaching of reading for American Indian students has recommended two major strategies: 1) utilizing reading material that is culturally relevant, that relates to the lives of the children, including language-experience stories and American Indian literature, and 2) strengthening and expanding the language ability of the children by providing a great deal of opportunity for oral language activities in English and the native language including many conversations, discussions, retelling of stories, reciting, reporting, etc.

Further, the approach taken in this document promotes viewing Indian children generally as global learners rather than analytic learners. Global learners often:

concentrate and learn when information is presented as a whole,
respond to emotional appeals and tend to like fantasy and humor,
process information subjectively and in patterns,
easily identify the main idea in a story,
learn easily through stories, and
use story context to figure out unknown words.

And consider the following in regard to teaching elementary science:

1. Students should gradually develop a sense of what science is.
2. An explicit goal of science should be to introduce young children to as many different phenomena of the real world as possible.
3. Science should build an appetite among students for learning how phenomena in the world work and how they connect to each other.
4. Elementary science should convince children that they can become part of the world of science and remain members all their lives.

All of the above information, from the professional literature, is utilized in the development of the suggested curriculum units included in this document. The materials and activities can help teachers of American Indian students **successfully teach them**. Four units are presented, organized according to topics. The topics are based upon available American Indian literature for children and are: Birds; Sun, Moon and Stars; Food; and Beavers to Buffalo.

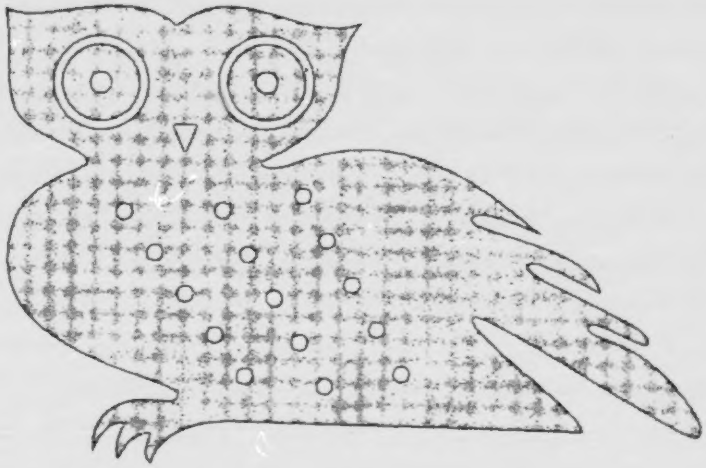
For each unit, the following are included:

1. Background information on the topic of the unit for the teacher.
2. A suggested scheme or outline showing how available American Indian literature and other children's literature can be formulated into a unit for kindergarten through third grade or for different phases within a multi-age or ungraded classroom. The units integrate language arts, math and science activities and suggest art activities that evolve from the topics. The units also include an emphasis on values and positive behavior, lessons learned primarily from the Indian stories.
3. Information about the suggested literature, the content it provides and why it is organized as it is. The literature is organized mainly by subtopics and assigned to phases more according to interest levels than reading levels. Therefore, in the literature suggested for a phase, there may be materials of different reading levels, but it is the subtopic and what is done with the material that makes the difference. Selection of literature to be used is ultimately the choice of the teacher with his/her own students in mind.
4. Further resources that can be used in place of some of the literary pieces selected for the unit or for further student reading/activities. A teacher may decide that he/she wants to use only literature from the tribe or area of the students that are being taught. Or he/she may want to use only literature written by Indian authors. The further resources lists provide a wider choice of materials to draw from.

5. A word list for the topic, to be used to recognize patterns in words and for vocabulary expansion. These lists are not exhaustive, and the teacher may decide not to use some of the words. The lists include many of the words of the topic and particular spelling patterns that they contain, which should be helpful. For vocabulary expansion, remember that vocabulary should not be taught by providing lists of words and multiple choice tests but by including new words in discussions, etc. Students should become fluent in "bird words," for example.
6. The new, more challenging language arts, math and science content standards that will be covered if the suggested unit is implemented.
7. Example activities developed by teachers of American Indian children at math and science workshops held during the summers of 1992 and 1993 at Haskell Indian Junior College (Haskell Indian Nations University).
8. A page for the teacher to put his or her own ideas for materials or activities.
9. Pages for lesson plans, schedule.
10. Nursery rhymes and poetry for language and skills development.

Other considerations are:

1. Teachers will have to secure the literature they will use then decide when and how to use it. Will it be read to or by students once or will it be used in different ways for different instructional purposes? Will it be used for shared reading, guided reading, read aloud activities, or independent reading? Will all students read the same selection or will different selections be used with different students? Teachers will have to determine these things based upon the interests and needs of their students. Teachers will also have to determine whether students should then retell a story, respond to it, perform it, summarize and report information, etc., and if they should do so in writing or orally. The teacher should have literature circles in which students discuss, respond and compare and contrast stories. Different students can develop questions to be asked for a story, find new words, find the most interesting parts or the parts that relate to their lives or provide illustrations. Teachers should regularly review the language arts standards to ensure their coverage.
2. The suggested units are developed so that teachers will teach for understanding and application utilizing a spiraling approach. Addressing the same topic and some of the same words over and over, from one level to the next, will help provide confidence as students move on to higher level materials. The patterns they see and learn from one set of words can be applied to other words they encounter.



3. Teachers who utilize the approaches and activities included in these units will not have quiet classrooms. Students must be allowed a great deal of opportunity for oral language activities including meaningful conversations and discussions, oral recitations, retelling reporting, performing, etc.
4. The school's Indian studies or language courses should be organized around the same unit topics and serve to provide local tribal cultural and language instruction to complement each unit. The topic will provide structure and substance for native language instruction leading to conversational language.
5. The school must reach out to acquire parents' help. Parents must be trained to do the things that are listed on pages 3 and 4. Further, each week they must be involved with their child in a meaningful homework assignment for a unit.
6. Social studies can be incorporated into the units, including the study of cultures and cultural diversity; the study of people, places and environments; global connections and interdependence; and the study of interactions among individuals, groups and institutions. Career education can be included.
7. Teachers should coordinate the science standards, both regular and Indian standards, resources such as Joseph Bruchac's Keepers books or Greg Cajete's materials, and the regular science program along with the literature and example activities to provide a comprehensive approach to science.
8. Teachers should formulate math problems that relate to the topic areas and are based on the math standards and local situations.

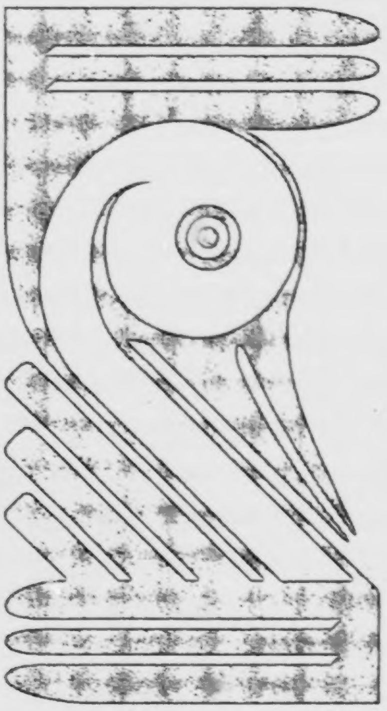
This document will not provide a teacher with a canned curriculum. The teacher or school should develop its own curriculum based upon the ideas in this book and available and acquired resources. This book contains suggested units covering 16 weeks to be used September – December with Birds in September; Sun, Moon and Stars in October; Food in November; and Beavers to Buffalo in December. Again, this is only suggested. Many schools do not have a written curriculum and prefer to rely on their textbooks as their curriculum. It is important for a school to have a written curriculum so all teachers know what they are expected to teach. Without one, teachers usually teach whatever they want. The information in this guide can provide the basis for sound primary curricula for American Indian schools. Teachers must blend this information with good practices they are already undertaking such as providing writers' workshop activities, cooperative learning, the use of technology, etc.

Teachers will have to choose which books to utilize. To check for bias, local tribal members can preview the books. The section, *Additional Resources*, at the end of this book, provides a listing of vendors for purchasing books. Teachers should first check their school libraries and various classrooms to determine if some books are already available. If teachers find that they are lacking materials in certain topic areas, they can rely on language-experience stories. Teachers may find that some books are more appropriate at phases other than those to which they are assigned. That's good. The addition of videos and other media will serve to enhance instruction. Tribes often have their own anthologies of legends. And, of course, real storytelling by local elders or others around one of the topics would be excellent. This must be done, though, with regard to local traditions as some storytelling is appropriate only at certain times, and there may be other conditions that must be honored.

Imagine what a strong primary program you could have if you provided a program based upon the latest research including what is recommended for teaching Indian children, you coordinated your instruction with that of the Indian studies/language staff, and you acquired good parental support and assistance by having them provide reading and language time with their children. You can supply parents with books on the topics you are studying and have them also learning and reading about the topics. They will be so much more interested in helping if they are a true part of the program. See the section for parents and tutors. If you have the luxury of having tutors for your students, they can also be extremely helpful by providing extra reading and language time, based on the topic areas, with your students. By having a program developed around themes or topics, you can do all these things easier.

Good luck as you create a sacred place for your students.

Birds



Background Information for Teachers and Parents

Phases 2 and 3

It is important to incorporate Indian culture into the curriculum for many reasons:

1. It can help make children proud to be Indian as they learn of the many connections between scientific and mathematical knowledge and Indian culture.
2. It can help them learn more as they understand how science and math connect to their real worlds.
3. It can motivate them to read more if they read about their own worlds.
4. It can help them know how they are to live their lives.

Indian stories are important links to learning science and math and how to live. Following is a story that appeared in *Indian Country Today*.

> Long time ago, the Wamakas'kan (animal nation, including man) came to a shocking awakening because the world they were enjoying became dark and ugly, and they realized that they were not living the teachings of Tunkasina (Grandfather/God) and the Universal Law of Love for self and one another, Respect for self and one another and Honor for self and one another. These are only some of the teachings that they were supposed to live by, but they did not pay attention and lived a life of recklessness and abused the energy they were given by Tunkasina which led to a life of corruption, greed and an unnatural lifestyle.
>
> The Wamakas'kan did not know where to turn to for help and were silent. Suddenly off in the distance, they heard a noise and were silent, and it pleased the heart. As the sound came closer, they realized that this sound was Wakan (holy/Sacred), a "Sacred Vibration" that brought tears to the eyes. When they could see the thing making the noise, it was a bird.
>
> The bird sang, "Follow me, I will show you a place of peace and harmony where there is Respect, Love and Honor." – Dakota

This story was printed as a tribute from Marty Indian School in South Dakota to Jackie Bird, Native American singer/performer, Featherstone, Brookings, SD.

Your children will be reading Indian and other stories about birds. These stories will help your children learn math and science, reading, writing, speaking and listening skills and how to live.

Background Information for Teachers and Parents

Phases 4 and 5

Why Should Curriculum Incorporate Science and Culture-Related Concepts?

– ORBIS Associates

A main reason for incorporating cultural concepts into science instruction for American Indian students is because Indian people have always been "scientists." Native cultures are holistic and, hence, view nature as the interactive relationships among living beings. For native people(s), maintaining their relationship with nature was critical to survival, both physically and spiritually. Their knowledge preceded the advent of scientific inquiry as it is known in the modern world. Native peoples pursued knowledge of the physical world and natural phenomena before anyone bore the modern day title of "scientist." Contemporary scientists credit Indian people with being exemplary users of "multiple use conservation."

> Native Americans have often been called the First Environmentalists because of the traditional concern for all living things on Mother Earth. That many of their men and women have achieved highly developed skills and extensive, intimate knowledge about the movements of the heavenly bodies, the chemical qualities of plants, and the medicinal applications of animal and botanical matter, has long been known and acknowledged by a number of anthropologists.

Such intimate knowledge leads to another reason for blending science and cultural concepts. Many contributions to science have been made by native people as a result of their detailed knowledge regarding the habits, habitats, ecological communities, microdistributions, seasonal variations, and recent history of the plant and animal species.

By exploring native cultures through a holistic perspective and through the contributions of native people, American Indians can truly be presented as multidimensional human beings – as complex, specialized, and knowledgeable individuals and acknowledges Indians as serious students of the world in which they live.

> The impressive knowledge of the Native American peoples about a wide variety of natural phenomena is not...accidental, nor has its acquisition been haphazard. It is based on generations of systematic inquiry. It is the accumulation and transmittal of repeated observations, experiments, and conclusions. Some of the elements of the scientific method were inherent in their processes. Native Americans have understood, beyond the obvious, many of the relationships among different types of substances.

Indians' view of the world is symbolized by the sacred circle, i.e., the life cycle, the cycle of seasons, the roundness of the sun and moon and their orbital movements. All things work as a part of the circle and, therefore, are sacred and must be treated with respect. In addition, the earth is regarded as a mother which gives life to all things.

Promoting the scientific aspects of native culture can reinforce the usefulness of science to native people and encourage Indian students to learn the skills required for advanced studies in science. Indian educators should try to prepare Indian students for science study by stressing its importance. Indian role models should be provided as much as possible. The more an Indian student hears references to Indians involved with scientific studies, either historically or currently, the more likely that he or she will consider science as a viable career option to pursue and/or be interested in science.

Suggested Primary Level Unit Outline – Birds

Reading, Language Arts, Science, Math, Art, Values	**Literature – Week 1**	**Literature – Week 2**
P Bird Words **H** Reading Nonfiction **A** Summarizing/Reporting **S** Reading Legends/Fiction **E** Comparing/Contrasting/ Retelling/The Oral Tradition **F** Characteristics of Eagles **I** Endangered Status/Numbers **V** Flight of Fantasy/Bruchac **E** Drawing an Eagle Eagle Teachings/Bruchac	*Eagles for Kids* by C. Gleek *Eagles: Facts, Stories, Games* by Lucy Baker *Eagles, Hunters of the Sky* by Ann C. Cooper *Eagles of America* by Dorothy H. Patent *Bald Eagle* by Gordon Morrison	*Adopted by the Eagles* by Paul Goble "Eagle Boy" in *Keepers of the Animals*/Caduto & Bruchac "Eagle and the Boy" in *And It Is Still That Way* by Byrd Baylor *Eagle Boy* by G. Hausman *Eagle Boy* by R.L. Vaughn *Eagle Feather, An Honour* by Ferguson Plain
P Bird Words **H** Reading Nonfiction **A** Summarizing/Reporting **S** Reading Fiction/Legends **E** Retelling/Responding Raptors/Hawks **F** Cycle of Life/Food Chain **O** Are Hawks Here? **U** Hawk Silhouette Art **R** Connections to Nature	*Amazing Birds of Prey* by J. Parry-Jones *Raptors (Birds Up Close)* by Bobbie Kalman *Summer of the Falcon* by Jean C. George *Sky Dancer* by Jack Bushnell *Matthew's Meadow* by Corrine D. Bliss	*Hawk, I'm Your Brother* by Byrd Baylor *Crow and Hawk: A Traditional Pueblo Indian Story* by Michael Rosen *How Coyote Helped to Light the World* by Anne B. Fischer
P Bird Words **H** Reading Nonfiction **A** Summarizing/Reporting **S** Reading Legends **E** Retelling/Performing Legends Characteristics of Birds **T** Needs of Birds/Migration **H** Feeding Birds/Costs **R** Observing Birds **E** Drawing/Labeling Bird Parts **E** Respect for Birds/Others	*Birds: Explore the Amazing World of Birds* by Jen Green *Birds, Birds, Birds* by National Wildlife Federation *Birds* by Claude Delafosse *What Makes a Bird a Bird* by Mary Garelick	"Manabozho and the Woodpecker" in *Keepers of the Animals*/Caduto & Bruchac *Coyote: Trickster Tale* by Gerald McDermott *Iktomi and the Buzzard* by Paul Goble *Iktomi and the Ducks* by Paul Goble *Nanabosho, Soaring Eagle* by Joe McClellan
P Bird Words **H** Reading About Birds **A** Summarizing/Reporting **S** Reading Bird Stories **E** Retelling Listening How Birds Look **T** Bird Watching/Observing **W** Counting/Coloring Birds **O** Gift of Beauty in Nature	*About Birds: A Guide for Children* by John Sill *Bird Watch: A Book of Poetry* by Jane Yolen *Crinkleroots Guide to Knowing the Birds* by Jim Arnocky *Birds at Your Fingertips* by Judy Nayer	*The Great Ball Game: A Muskogee Tale* by Joseph Bruchac *How the Birds Got Their Colours* by B. Johnston & D. Ashkewe *Coyote and the Winnowing Birds*/Eugene Sekaquaptewa *The Ring in the Prairie* by John Bierhorst

Literature – Week 3	Literature – Week 4	Reading, Language Arts, Science, Math, Art, Values
Raven: Trickster Tale by Gerald McDermott *How Raven Freed the Moon* by Anne Cameron *Raven Returns the Water* by Anne Cameron *Raven Brings to the People Another Gift* by M. Ann Reed *Raven: A Collection of Woodcuts*/D. DeArmond	*Raven and River* by Nancy White Carlstrom "Octopus and Raven" in *Keepers of the Animals*/Caduto & Bruchac *Sika and the Raven* by Carl Hammerschlag *A Man Called Raven* by Richard Van Camp	Bird Words Reading Legends/Myths Retelling/The Oral Tradition Responding Comparing/Contrasting Reading Fiction Traits of Ravens Are Ravens Here? Raven Habitat Doing Woodcuts Art Respect for Nature/Others
Black Crow, Black Crow by Ginger F. Guy *King Crow* by Jennifer Armstrong *The Crow Who Stood on His Beak* by Rafik Schami *Clever Crow* by Cynthia Defelice *Carmine, the Crow* by Heidi Holder	*Crow Chief* by Paul Goble *Supper for Crow: A Northwest Coast Indian Tale* by Pierr Morgan *Rainbow Crow* by Nancy Van Laan *Aandeg: The Crow* by Shirley Pheasant Williams *A Crow Named Joe* by Peter Eyvindson	Bird Words Reading Legends/Myths Retelling/The Oral Tradition Responding Local Crow Stories Characteristics of Crows Crows as Scavengers Are Crows Here? Drawing Crows Being Clever in a Good Way
Rosie's Walk by Pat Hutchins *The Chicken Sisters* by Laura J. Numeroff *Ducks Don't Get Wet* by Augusta Goldin *Come Along, Daisy* by Jane Simmons *A Duck So Small* by Elizabeth Holstein *Tom Turkey* by Dave Sargent	*The Hen of Wahpeton* by Ann Nolan Clark "The Drake and the Falcon" in *Lakota and Dakota Animal Wisdom Stories* by Mark McGinnis *Shingesbiss* by Nancy Van Laan *Turkey and Giant* by Nedra Emery	Bird Words Reading Fiction Retelling/Responding Chickens/Ducks/Turkeys Ducks Designed for Water Birds We Eat Care of Chickens Weight/Cost of Chicken Visiting Chickens/Ducks Eggshell Art Being in Trouble
Baby Bird by Joyce Dunbar *Baby Birds* by Martina Bonsignori *Baby Bird's First Nest* by Frank Asch *The Best Nest* by Philip Eastman *Birdsong* by Audrey Wood *Bird Talk* by Ann Jonas	*Song of the Hermit Thrush* by Gloria Dominic "The Rattlesnake and the Meadowlark Family" in *Lakota and Dakota Animal Wisdom Stories* by Mark McGinnis *The Magic Hummingbird* by Ekkehart Malotki *The Hunter and the Woodpecker* by C. Crowl	Bird Words Reading About Birds Summarizing/Reporting Reading Bird Stories Retelling/Responding Bird Watching/Counting Baby Birds/Adult Birds Habits of Birds/Habitats Milk Carton Bird Houses Care for Family/Others

About the Literature for Phase Five

Indian people have great reverence for birds, especially the eagle and the raven for tribes in the northwest. Many Indian stories include these two birds.

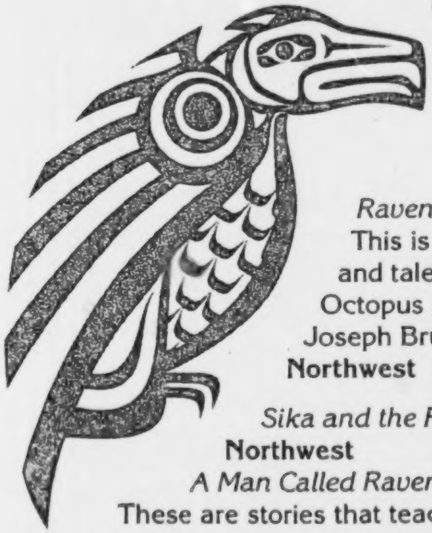
Eagles

Eagles for Kids by C. Gleek
Eagles: Fact, Stories, Games by Lucy Baker, Puffin Books, 1990.
Eagles, Hunters of the Sky by Ann C. Cooper, 1992.
Eagles of America by Dorothy H. Patent, 1995.
Bald Eagle by Gordon Morrison, Walter Lorraine, 1998.
These are all nonfiction about eagles. Information from them should be summarized, reviewed and reported. Selected books can be read or heard by all students or assigned to various students.

Adopted by the Eagles by Paul Goble, Aladdin, 1994. **Plains.**
Eagle Boy in *Keepers of the Animals* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1997. **Zuni** Also on audiotape.
Eagle and the Boy in *And It Is Still That Way* by Byrd Baylor, Trails West, 1976. **Pima**
Eagle Boy by G. Hausman. **Navajo**
Eagle Boy: A Pacific **Northwest** *Native Tale* by R.L. Vaughn, Sasquatch Books, 2000.
Eagle Feather, An Honour by Ferguson Plain (Indian Author), Pemmican Pub., **Ojibway**
The first five books are stories of close relationships between boys and eagles. They can be retold, in the oral tradition, and compared and contrasted. The last is the story of a young boy learning the values of life. This one could be read by gifted and talented students and read or retold to other students. Someone familiar with Indian spirituality could talk with the students about the significance of eagle feathers. Add local stories that include eagles.

Ravens

Raven: Trickster Tale by Gerald McDermott. **Northwest**
How Raven Freed the Moon by Anne Cameron, 1997. **Northwest**
Raven Returns the Water by Anne Cameron, Harbour Publishing. **Northwest**
Raven Brings to the People Another Gift by M. Ann Reed, Tipi Press, 1996. **Northwest**
Raven: A Collection of Woodcuts by D. DeArmond, Alaska **Northwest**, 1975.
These are stories including Raven, the trickster and hero. The stories should be retold in the oral tradition, and compared and contrasted.



Raven and River by Nancy White Carlstrom, Little, Brown, 1997. This is a story about raven and the land. It could be read by gifted and talented students and read or retold to other students.
Octopus and Raven in *Keepers of the Animals* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1997. **Nootka - Northwest** Also on audiotape.

Sika and the Raven by Carl Hammerschlag, Turtle Island Press, 1999. **Northwest**
A Man Called Raven by Richard Van Camp, 1997. **Northwest**
These are stories that teach respect for nature. Students should respond to them.

About the Literature for Phase Four

Indian people hold a reverence for birds. Birds, such as the hawk and crow, are included in many Indian stories.

Hawks (Raptors)

Amazing Birds of Prey by J. Parry-Jones, Knopf, 1992.
Raptors (Birds Up Close) by Bobbie Kalman, Crabtree Pub., 1997.
These two books are nonfiction about raptors. Information from them should be summarized, reviewed and reported. Some tribal groups might not wish to have owls included. Check with your local communities.

Summer of the Falcon by Jean C. George, Harper Trophy, 1979.
Sky Dancer by Jack Bushnell, Lothrop, Lee and Shepard, 1996.
Matthew's Meadow by Corrine D. Bliss, Voyager Picture Book, 1997.
These stories are fictional and include raptors, especially hawks. Selected materials can be read or heard by all students or they can be assigned to various students. Students can respond to these stories by telling how they feel about what happens.

Hawk, I'm Your Brother by Byrd Baylor, Aladdin, 1976. **Southwest**
Crow and Hawk: A Traditional Pueblo Indian Story by Michael Rosen, 1995. **Pueblo**
How Coyote Helped to Light the World by Anne B. Fisher. **Pomo**
These are all Indian Stories that include a hawk. They can be retold. Students can ask their parents if they have stories that include a hawk.

Crows

Black Crow, Black Crow by Ginger F. Guy, Greenwillow, 1991.
King Crow by Jennifer Armstrong, Knopf, 1995.
The Crow Who Stood on His Beak by Rafik Schami, Chronicle, 1996.
Clever Crow by Cynthia Defelice, Anthenium, 1998.
Carmine, the Crow by Heidi Holder, Farrar, Straus & Girous, 1996.
These books are fictional stories including a crow. They can be retold. The most difficult book might be read by gifted and talented students and read or retold to other students.

Crow Chief by Paul Goble, Orchard Books, 1992. **Plains**
Supper for Crow: A Northwest Coast Indian Tale by Pierr Morgan, 1995. **Northwest**
Rainbow Crow: A Lenape Tale by Nancy Van Laan, Knopf, 1999. **Lenape**
Aandeg: The Crow by Shirley Pheasant Williams (**Indian Author**), Waapoone Pub., **Ojibway**
A Crow Named Joe by Peter Eyvindson, Pemmican Pub., **Ojibway**
These are Indian stories that include a crow. The can be retold. Students can ask their parents if they have stories that include a crow.

About the Literature for Phase Three

Indian people hold a reverence for birds. Many Indian stories include birds.

About Birds

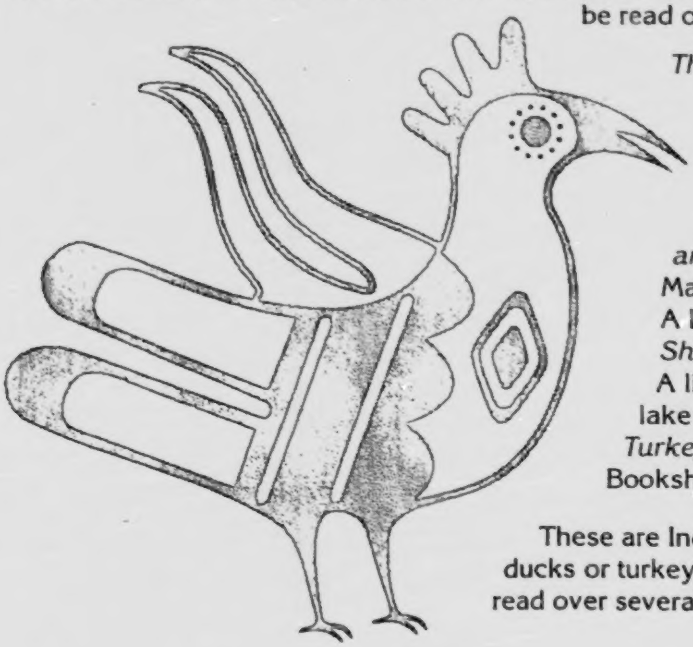
Birds: Explore the Amazing World of Birds by Jen Green, Peachtree, 1991.
Birds, Birds, Birds by National Wildlife Federation, McGraw Hill, 1997.
Birds by Claude Delafosse, Catchwheel Books, 1993.
What Makes a Bird a Bird by Mary Garelick
These are nonfiction about birds. Information from them should be summarized, reviewed and reported.

Tricksters and Birds

Manabozho and the Woodpecker in *Keepers of the Animals* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1997. **Anishinabe** Also on audiotape.
Nanabosho, Soaring Eagle by Joe McClellan (**Indian Author**), Pemmican Pub.
Coyote: Trickster Tale by Gerald McDermott. **Southwest**
Iktomi and the Buzzard by Paul Goble, 1994. **Lakota**
Iktomi and the Ducks by Paul Goble, 1990. **Lakota**
These are trickster stories that involve birds. They can be retold. Selected stories can be read or heard by all students or can be assigned to various students or groups.

Chickens, Ducks and Turkeys

Rosie's Walk by Pat Hutchins, 1983.
The Chicken Sisters by Laura J. Numeroff, Harpercollins, 1999.
Ducks Don't Get Wet by Augusta Goldin, Harpercollins, 1999.
Come Along, Daisy by Jane Simmons, Little, Brown & Co., 1998.
A Duck So Small by Elizabeth Holstein, Little Tiger Press, 1998.
Tom Turkey by Dave Sargent.
These are selections that include chickens, ducks or turkeys. They can be retold. They should be read over several times.



The Hen of Wahpeton by Ann Nolan Clark, Haskell Indian Nations University, Bureau of Indian Affairs, 1943. **Dakota** A hen wants to be in the movies.
The Drake and the Falcon in *Lakota and Dakota Animal Wisdom Stories* by Mark McGinnis, Tipi Press, 1994. **Lakota** A boastful drake is caught.
Shingesbiss by Nancy Van Laan. **Ojibwa** A little duck finds plenty of food until the lake freezes.
Turkey and Giant by Nedra Emery, Salina Bookshelf, 1996, **Navajo**

These are Indian stories that include chickens, ducks or turkeys. They can be retold. They should be read over several times.

About the Literature for Phase Two

Indian people hold a reverence for the birds. Birds are often included in Indian stories.

About Birds

About Birds: A Guide for Children by John Sill.
Bird Watch: A Book of Poetry by Jane Yolen, Paper Star, 1999.
Crinkleroots Guide to Knowing the Birds by Jim Arnocky, Simon & Schuster, 1992.
Birds at Your Fingertips by Judy Nayer, McClanahan Book Co., 1995.
These are books mainly about identifying birds. Information from them should be summarized, reviewed and reported.

Bird Stories

The Great Ball Game: A Muskogee Tale by Joseph Bruchac (**Indian Author**), Dial Books. **Muskogee Creek** Why the birds fly south in the winter.
How the Birds Got Their Colours by Basil Johnston and Del Ashkewe (**Indian Author**), Kids Can Press, 1978.
Coyote and the Winnowing Birds by Eugene Sekaquaptewa (Indian Author), Clear Light Publishing, 1994. **Hopi** How Coyote tricks the birds who find a way to trick him back.
The Ring in the Prairie by John Bierhorst, Dial, 1976. **Shawnee** The creation of the birds.
These are Indian stories about birds. They should be retold. Students can ask their parents if they have stories that include birds and retell them at school.

More About Birds

Baby Bird by Joyce Dunbar, Candlewick Press, 1998.
Baby Birds by Martina Bonsignori, Boyds Mill Press, 1992.
Baby Bird's First Nest by Frank Asch, Gulliver Books, 1999.
The Best Nest by Phillip Eastman, Random House, 1998.
Birdsong by Audrey Wood, Harcourt Brace, 1997.
Bird Talk by Ann Jonas, Greenwillow, 1999.
These are books about birds and their habits. Information from them should be summarized, reviewed and reported.

More Bird Stories

Song of the Hermit Thrush by Gloria Dominic, Troll, 1996. **Iroquois** The animals and the birds have a contest to see who has the prettiest song.
The Rattlesnake and the Meadowlark Family in *Lakota and Dakota Animal Wisdom Stories* by Mark McGinnis, Tipi Press, 1994. **Lakota** A meadowlark tricks rattlesnake.
The Magic Hummingbird by Ekkehart Malotki, Lickle Pub. Co., 1994. **Hopi**
The Hunter and the Woodpecker by C. Crowl, Tipi Press, 1990. **Lakota** How the flute was brought to the people.
These are Indian stories that include birds. They can be retold. Add local stories that include birds.

Further Resources for Birds Unit

These materials can be used to substitute for books in the suggested unit outline or for additional reading/other activities for students.

The Bird Alphabet Book by Jerry Pollotta, Charlesbridge Pub., 1989.

Roger Tony Peterson's ABC of Birds: A Book for Little Birdwatchers by Roger Tony Peterson, Rizzoli Bookstore, 1995.

Feathery Facts by Ivan Chermayeff, Gulliver Books, 1995.

Fly With the Birds: A Word and Rhyme Book by Richard Edwards, 1996.

How to Draw Birds by John Green, 1999.

Birds Coloring Book by Lisa Bonforte, Dover Little Activity Books, 1993.

Counting is for the Birds by Frank Mazzala, Jr. 1997.

Northern Plains Indian Coloring Book by C. Peterson and Anna Rubia, Varia, 1998.

Birds by Angela Payston, Aladdin, 1992.

Are You My Mother? by Philip Eastman, Random House, 1988.

"Why Birds Go South" in Tales the Elders Told: **Ojibway** Legends by Basil Johnson, Royal Ontario Museum, 1981.

How Turtle Flew South for the Winter in Keepers of the Earth by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1988. **Dakota**

Shemay, the Bird in the Sugarbush by David Martinson, **Anishinabe** Reading Materials, Duluth Indian Education Advisory Committee.

Grandmother's Pigeon by Louise Erdrich (**Indian Author**), Hyperion, 1999. **Indian**

"How the Redbirds Got Their Color" in Wolf Tales by Mary Powell. **Indian**

Sacred Song of the Hermit Thrush, A **Native American** Legend by Tehanetorens (**Indian Author**), Book Publishing, Summertown, TN.

Stories involving birds in **Hopi** Coyote Tales by Ekkehart Malotki (**Indian Author**), University of Nebraska Press, 1984.

Ka Ha Si and the Loon by Terri Cohlen, Troll. **Eskimo**

The Loon's Necklace by William Toye, Oxford Press, 1977. **Tsimshian**

Love Flute by Paul Goble. **Lakota** Also on audio tape.

The First Flute in Keepers of the Animals by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1997. **Lakota**

How the Robin Got Its Red Breast: A Legend of the ***Sechelt*** People by Charlie Craigan, 1997.

"How the Robin Came To Be" in ***Ojibway*** Indian Legends by Cheryl M. King, North Michigan University Press, 1972.

The Legend of the White Dove by W. H. Hooks, Macmillan, 1988. **Indian**

Iktomi and the Crane, Little Wound School Bilingual Program. **Lakota**

How the Birch Tree Got its Stripes: A **Cree** Story by F. Ahonokew or Dean Whitestone, Fifth House, 1988.

The Crane in **Lakota** and Dakota Animal Wisdom Stories by Mark W. McGinnis, Tipi Press, 1994.

April Wilson's Magpie Magic by April Wilson, Dial Books, 1999.

Huckleberry Robin by Betsy Schabacker, 1998.

Desert Birds by Alice Flanagan, 1996.

Under Wing and Sky: Birds of the Badlands and Black Hills by M. Melius, Fenske, 1995.

The Little Red Hen by Paul Galdone, Scholastic.

The Wolf's Chicken Stew by Keiko Kasza, Putnam, 1996. **Included in some basal readers**

The Chick that Wouldn't Hatch by Clair Daniel, Harcourt Brace, 1999.

Daisy and the Egg by Jane Simmons, Little, Brown, 1999.

The Ugly Duckling by Margaret Wise Brown, 1994.

The Littlest Duckling by Gail Herman, Viking, 1996.

Ducks and Introductions in the Trickster and the Troll by Virginia Driving Hawk Sneve, (**Indian Author**), Bison Books, 1999. **Lakota**

"Turkey Girl" in Our Father Story Teller by Pablita Velarde (**Indian Author**), Clear Light Pub., 1989. **Pueblo**

Turkey Girl by Penn Pollock. **Zuni**

Turkey's Gift to the People by Ann Rucki, 1992. **Indian**

A Crow's Journey by David Cunningham, Albert Whitman, 1996.

"How the Crow Became Black" in Indian Legends of the **Paiute**, **Shoshone** and **Washoe** Tribes, State of Nevada Dept. of Ed., 1972.

Hawk, poem by Simon Ortiz (**Indian Author**). **Pueblo**

Rico's Hawk by Randy Hook, Green Chimney's Tale with book, 1999.

Owl: Animal Lore and Legend by V. Browne (**Indian Author**), Scholastic, 1995.

Tonweya and the Eagles by Rosebud Yellow Robe (**Indian Author**), Dial. **Lakota**

Eagle Dreams by Shirley McFarlane, Orca Book Pub., 1998.

Hidatsa Eagle Trapping, Reprints in Anthropology, Vol. 13 by Gilbert Wilson, Reprinted 1978, J. & L. Reprint Co.

Gluscabi and the Wind Eagle in Keepers of the Earth by Caduto and Bruchac (**Indian Author**), Fulcrum, Inc., 1988. **Abenaki** Also on audio tape.

The Old Beaver Woman and the Eagle in **Lakota** and Dakota Animal Wisdom Stories by Mark W. McGinnis, Tipi Press, 1994.

I Am the Eagle Free by Simon Paul-Dene (**Indian Author**), Theytus Books, **Iroquois**

Brave Wolf and the Thunderbird by Medicine Crow (**Indian Author**), Abbeville Press.

Native American Animal Stories by Joseph Bruchac (**Indian Author**). Stories from Keepers of the Animals.

Mind of the Raven: Investigations and Adventures with Wolf-Birds by Bernd Heinrich.

How Raven Stole the Sun by Maria Williams, National Museum of the American **Indian**

How Raven Made the Tides in Keepers of the Earth by Caduto and Bruchac (**Indian Author**), Fulcrum, Inc., 1988. **Tsimshian** Also on audio tape.

Kivok's Magic Journey: An **Eskimo** Legend by James Houston, Atheneum, 1973.

Lesson of the Feather by Cal Thunder Hawk (**Indian Author**), Tipi Press, 1998. **Lakota**

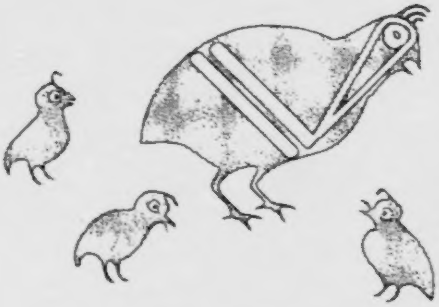
Bird stories in the Indian Reading Series: Stories and Legends of the **Northwest**: Birds and People, Owl Boy, Pet Crow, Owl's Eyes, Coyote and Raven, Duckhead Necklace by Educational Systems, Inc.

All About Turkeys by Jim Arnosky

Mousekin's Thanksgiving by Edna Miller

The Christmas Bird by Bernadine Watts, Chronicle, 1996.

Little Robin's Christmas by Jan Fluenley, 1998.



CHECK YOUR LIBRARY OR BOOKSTORES FOR OTHER BOOKS RELATING TO YOUR TOPIC.

Books in italics are especially suited for Phase One - for preschool children.

BIRD WORDS

BEGINNING SOUNDS

feather
formation
falcon
fly
flew
flight
flap
flock
float
fowl

sing
song
soar
south
scavenger
sky
squawk
swoop
sparrow
screech

hunt
hen
high
hawk
hatch
heron

buzzard
bird
beak
bug
breast
bread

raven
raptor
roost
rooster
robin

perch
peck
parrot
partridge
pigeon
prey
prairie chicken
plume
predator

ENDING SOUNDS

circling
gliding
flapping
screeching
squawking
singing
diving
cackling
soaring
roosting
swooping
wing

duck
flock
chick
peck
lark
squawk
hawk
beak
drake

LONG VOWEL SOUNDS

glide
dive
dove
crane
drake
tail
eagle
meat
beak
float
tree
screech

SHORT VOWEL SOUNDS

thrush
buzzard
duck
bug
tuft
hunt
land
flap
branch
raptor
hatch
scavenge

hen
peck
nest
limb
chicken
insect
robin
ostrich
observe
flock
song

OTHER WORDS

aerie
dove
crow
leg
egg
oriole
talon
quail
watch
ornithology

worm
claw
waddle
shell
macaw
molt
grouse
woodpecker
incubator
canary

R-CONTROLLED VOWELS

lark
partridge
cardinal
formation
north
raptor
perch
observe
chirp
bird
turkey
vulture

COMPOUND WORDS

bluebird
songbird
hummingbird
blackbird
roadrunner
meadowlark
scarecrow
birdcall
birdhouse
birdseed
birdbath
birdcage

Word walls should be maintained. Instructors should ensure that students know the meanings of all of these words in this context and extend vocabulary by noting how they may mean other things in other contexts or they may have homophones. Experiences, pictures and student illustrations should be used to explain and process word meanings. Words that rhyme with these words can be examined to see varying spellings for sounds. Other words should be added. Teach the meaning of sayings such as "feather your nest," "kill two birds with one stone," or "a bird in the hand is worth two in the bush."

Science Standards and Benchmarks for Birds Unit

Standard – Understands that scientific inquiry works in particular wayss
Benchmarks
Understands that learning can come from careful observations
Understands that tools like binoculars add to information from our senses

Standard – Understands the processes that shape the surface of the earth and the relation of the surface of the earth to the living environment
Benchmarks
Knows that change is something that happens to many things around us
Knows that living things respond to the conditions around them, and they can sometimes change their surroundings

Standard – Knows about the diversity and unity that characterize life
Benchmarks
Knows that some animals and plants are similar in appearance and behavior, and others are very different from one another
Knows that stories sometimes give plants and animals attributes they really do not have

Standard – Understands the genetic basis for the transfer of biological characteristics from one generation to the next
Benchmarks
Knows that offspring grow up to be similar to their parents

Standard – Knows the general structure and functions of cells in organisms
Benchmarks
Knows that most plants and animals need air, food and water
Knows that plants and animals are composed of different parts, serving different purposes and contributing to the well-being of the whole organism

Standard – Understands how species depend on one another and on the environment for survival
Benchmarks
Knows that animals eat plants or other animals for food and may also use plants for shelter and nesting

Mathematics Standards and Benchmarks for Birds Unit

Standard – Effectively uses a variety of strategies within the problem solving process
Benchmarks
Brainstorms possible things to do
Draws pictures to represent problems
Represents problem situations using physical objects
Clarifies problems using discussions with teacher or knowledgeable others

Standard – Understands and applies basic and advanced properties of numbers
Benchmarks
Has a general understanding of the concept of number
Uses counting to exemplify numbers

Standard – Uses basic and advanced procedures while performing computation
Benchmarks
Adds, subtracts, multiplies, divides whole numbers with accuracy
Adds, subtracts, multiplies, divides decimals with accuracy

Standard – Understands and applies basic and advanced methods of measurement
Benchmarks
Understands the basic characteristics of weight and how it is measured

Standard – Understands and applies basic and advanced concepts of data analysis and distributions
Benchmarks
Has a basic understanding of the concept of data

Language Arts Standards and Benchmarks for Birds Unit

Standard – Gathers information effectively through reading, listening and viewing
Benchmarks
Provides an accurate retelling of the basic plot of simple stories the student has read, heard or viewed
Provides an accurate retelling of the main idea of simple expository information the student has read, heard or viewed
Understands that reading, viewing and listening are ways of gaining information about the world
Determines meaning of simple words from context
Creates mental representations for concrete information read, heard or viewed

Standard – Reads and responds to literature
Benchmarks
Understands that stories have beginning, middle and ending episodes
Understands the genre of legends and fables

Standard – Communicates ideas and information in writing
Benchmarks
Understands basic connections between spelling patterns and speech sounds
Understands basic phonological patterns in English
Expresses ideas in simple expository forms
Composes simple stories that express cohesive ideas

Standard – Understands and applies basic principles of language use
Benchmarks
Recognizes characteristic sounds and rhythms of language
Makes valid observations about the use of words

Standards and Benchmarks from *The Systematic Identification and Articulation of Content Standards and Benchmarks*, Mid-continent Regional Educational Laboratory, 1994.

American Indian Content Standards for Birds Unit

Science

Science as Inquiry –
Indian students should develop an awareness that observations and understandings of ecological relationships traditionally formed an essential base of knowledge among American Indian cultures.

Earth and Space Science –
Indian students should develop an understanding of objects in the sky as exemplified by knowledge of weather patterns and the habits of birds.

Life Science–
Indian students should develop an understanding of plant and animal life cycles as exemplified in traditional American Indian concepts such as the Medicine Wheel.

Indian students should develop an understanding of characteristics of various animals as exemplified in traditional American Indian stories, legends, songs and dances.

Language and Literacy

Indian students should be able to:

Listen for meaning and gain information from spoken English and a Native language.

Listen to Indian stories told in the oral tradition, comprehend their teachings and be able to retell them.

Speak coherently, conveying ideas in both English and a Native language.

Read fluently and independently, a variety of materials including those with American Indian themes.

Locate and use a variety of texts to gain information, for example, historical materials about their tribe, tribal legends and stories and oral history transcription.

Be familiar with children's literature with Indian themes, especially with that pertaining to the student's tribe and literature written by Indian authors.

Mathematics

Mathematics as Problem Solving –
Indian students should formulate problems from everyday and mathematical situations within their home and tribal/community worlds.

Mathematics as Communication –
Indian students should relate their everyday language to mathematical language and symbols including expressing mathematical concepts in their Native languages.

Estimation –
Indian students should explore estimation strategies through activities derived from their cultural worlds such as estimating the number of sheep/horses that fit in a pen/corral.

Fractions and Decimals –
Indian students should apply fractions and decimals by applying them to real world situations using Native cultural experiences.

Example Activities Developed by Teachers of American Indian Students

Workshop on Culturally-Based Math and Science Curriculum Development

Haskell Indian Nations University
1992 & 1993

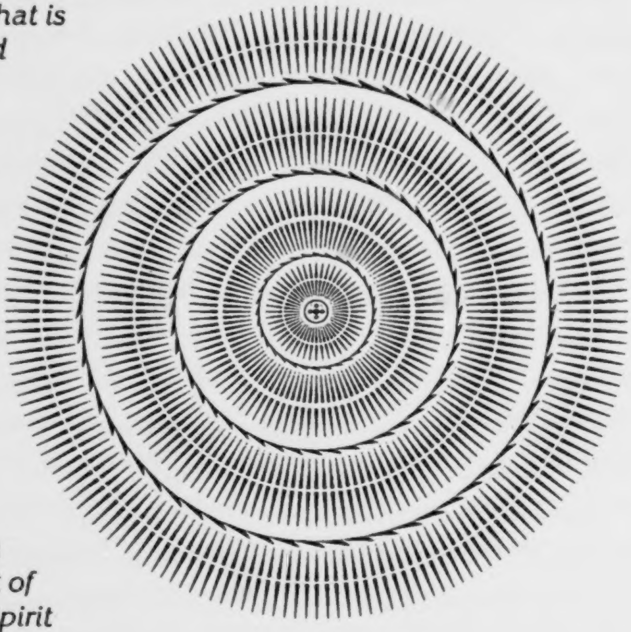
Ideas included should be adapted for appropriateness.

Medicine Wheel

The relationship of Native Americans to Mother Earth has always been deeply rooted in their spiritual belief that everything in nature is one and man is part of this Circle of Life.

Lakota spiritual elder Black Elk explained:

> *"You have noticed that everything an Indian does is in a circle, and that is because the power of the world always works in circles...The sky is round, and I have heard that the earth is round like a ball, and so are the stars.*
>
> *The wind, in its greatest power, whirls. Birds make their nests in circles, for their's is the same religion as our's...The life of a man is a circle from childhood to childhood...Our tipis were round like the nests of birds, and these were always set in a circle, the nation's hoop, a nest of many nests, where the Great Spirit meant for us to hatch our children."*



Man is a part of the universe...he must keep his universe in balance.

We undertake this sharing to teach a lesson about our relationship to each people and their place.

We undertake this sharing to demonstrate respect. Foremost, respect for the Creator and all of the creatures.

The challenge is to all of mankind as the guardian of the WORLD and all its inhabitants.

SCIENCE

Birds

Cultural Objective

Students will learn how birds fit into the cycle of life and to have reverence for birds.

Science Objectives

Students will learn the following:

Many wild birds are good food for people and some animals.

Domestic birds such as chickens and turkeys are good food for people.

Some people make money from the sale of eggs and fowl.

People enjoy hearing birds sing.

People enjoy the colors of birds' feathers.

Watching birds get food, make nests and care for their young ones is interesting to people.

Sometimes people wear the feathers of birds, on hats or for dance or ceremonial purposes.

Medicine men use birds' feathers for ceremonial purposes.

Feathers are used on arrows to balance them.

In some places pictures are made with birds' feathers.

Feathers help to keep birds warm and dry.

Birds eat insects that destroy orchards and gardens.

Birds eat insects that are harmful to forests and to plants on grazing lands.

Birds carrying seeds from place to place help keep plants growing over wide areas.

Birds destroy many seeds of plants that are harmful to gardens, forests, grazing lands and animals.

Hawks eat other birds and small animals.

Crows and blackbirds often dig up planted garden seed.

Birds need food, water, sleep and shelter.

Domestic birds need food, water, sleep, shelter and regular care.

Some birds need shelter that people can provide.

In winter many birds fly south where it is warm.

Some birds stay in the same place all year.

It is good to protect birds.

All birds have English and Native language names. One can speak about their body parts and the things they do in English and the Native language.

Teacher Background Information

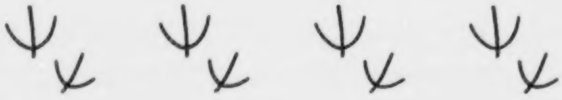
As the children learn about birds, they have excellent opportunities to learn to count, compute, measure feed and to understand time. Much storytelling, experience reading and writing can take place. Dramatization of some of the stories is an excellent oral language activity. The use of rhymes, poetry and songs will enrich the study. Children can learn to distinguish different bird calls or songs. Children can make clay birds or beautiful pictures of various birds. Children can watch and study birds and, of course, learn how birds are viewed in the local Tribal culture.

Student Learning Activities

1. Make bird books. Cut out pictures of birds from magazines or draw different birds to put in a book with captions.
2. Entice the birds to come outside your classroom window with a bird bath, bird house or bird food. Watch and study the birds.
3. Make bird posters to place around in your classroom or in the hallway.
4. Take a field trip and see how many different birds you see. Be good scientists and keep good records.
5. In the winter, look in the snow for bird tracks. Some birds don't leave in the wintertime.
6. Visit a farm and watch chickens, turkeys or ducks.
7. Prepare food from eggs and chickens. Discuss the cycle of life.
8. Discuss the cost of eggs and chickens.

Evaluation

Have each student write a summary of what he or she learned about birds.



MATH AND SCIENCE

Interlocking Circles of Life

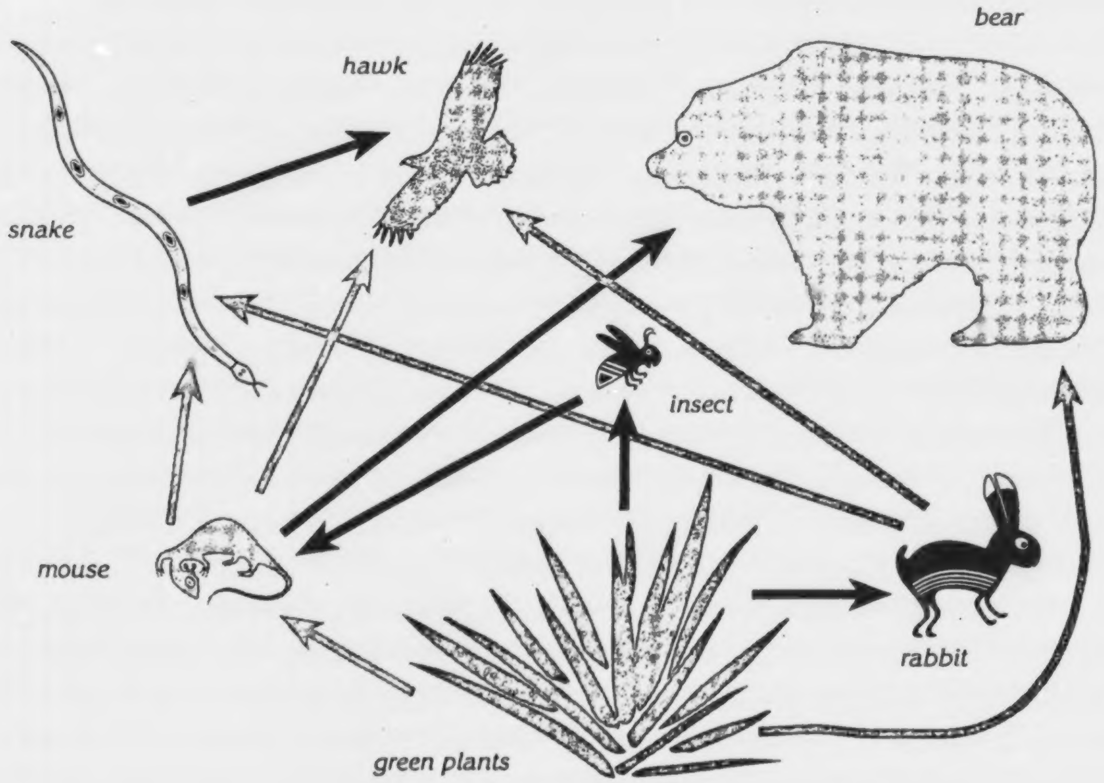
Cultural Objective

Students will learn that the cycle of life will continue as long as people practice reverence for all living things.

Math Objectives

Students will:

- ✓ estimate the solution to a given problem using whole numbers, fractions and decimals
- ✓ construct simple line/bar graphs, tables and charts
- ✓ interpret pictographs and use information to solve story problems
- ✓ read and interpret a given set of information contained in a table, graph or chart



Science Objectives

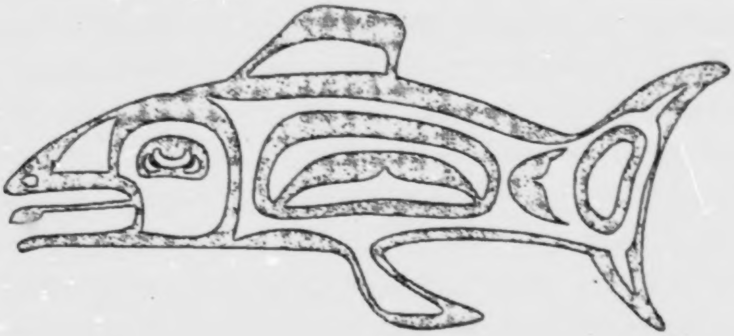
Students will:

- ✓ recognize that different plants and animals inhabit different biomes and have a major impact on the environment
- ✓ recognize that all living things have basic survival needs
- ✓ list ways that organisms take part in natural cycles
- ✓ explain the importance of natural cycles in the ecosystem
- ✓ gather information
- ✓ understand and apply information and concepts
- ✓ analyze, synthesize and evaluate information
- ✓ explain cause and effect
- ✓ identify life processes common to all living things

Teacher Background Information

The Haida people eat the salmon which they catch with deep gratitude and respect. They live in balance with nature's interlocking Circles of Life. If people live a balanced life and treat all living things well, the salmon will swim upstream and offer their bodies so people can eat. In return, people must give the bones and other remains back to the water so the circle of giving and receiving will never be broken.

Among the Haida people, there was a boy who did not respect salmon even though the fish gave up its body to provide nourishment and life for his people. When he caught a salmon, he would throw the bones in the bushes after he had eaten his fill. The spirits of the salmon were displeased with his actions and warned him of the consequences but he did not listen.

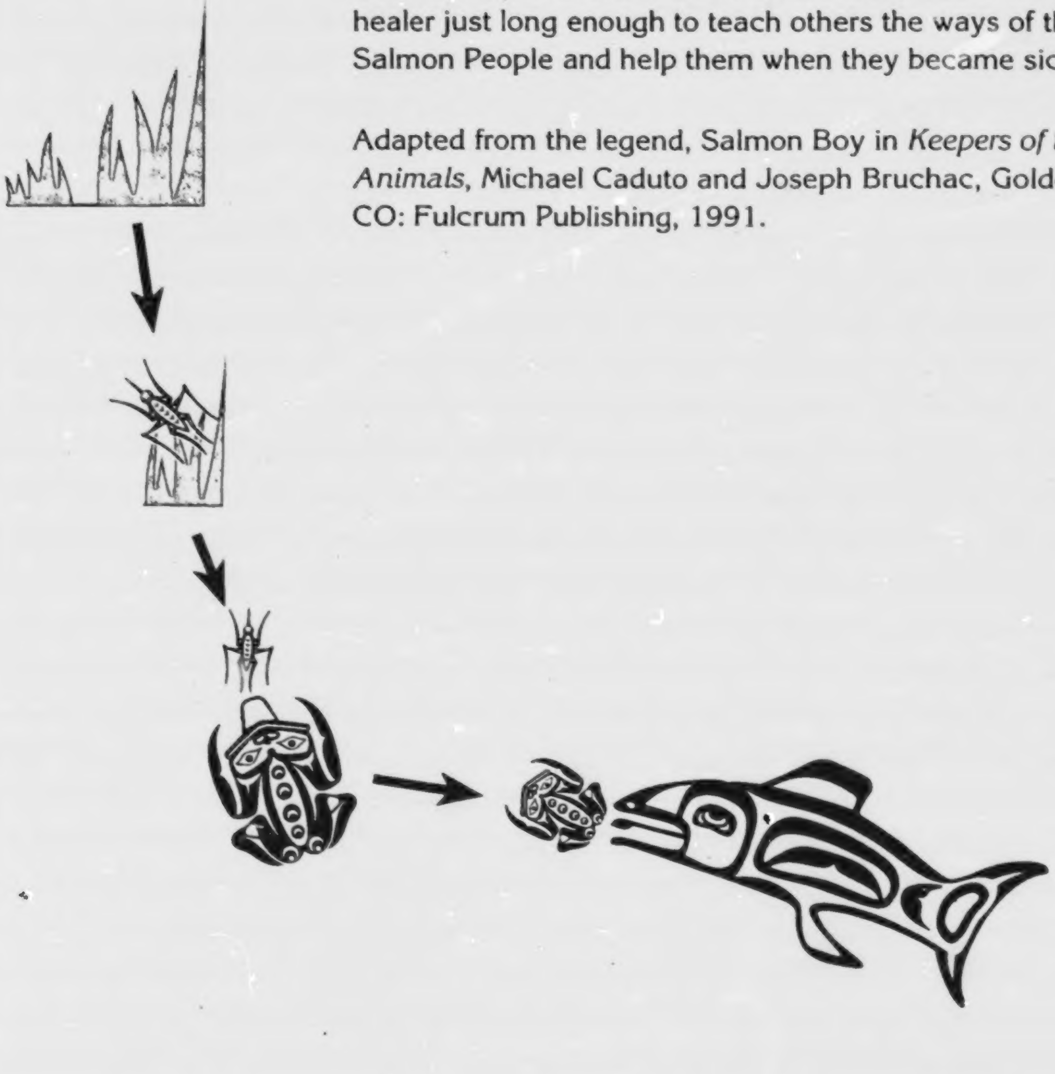


Sure enough, one day a current swept him into the deepest part of the water and he drowned. The Salmon People took him along with them to their home in the ocean. The Salmon People without their bodies looked just like human beings and their village in the ocean was similar to the boy's own village. Here they taught the boy many important lessons. They told him that even though people catch and eat them they must do so with great respect and gratitude and return their bones and all they do not consume back to the water. They were to do this so that the circle of giving and receiving will never be broken and the salmon children would come back.

We learn that the Salmon People did not harm or react angrily to the boy because of his disrespect for the circle of life's balance; instead, they made him one of them in spirit and taught him how to care for and respect them in both body and spirit.

Salmon Boy later returned to his mother and his village as a healer just long enough to teach others the ways of the Salmon People and help them when they became sick.

Adapted from the legend, Salmon Boy in *Keepers of the Animals*, Michael Caduto and Joseph Bruchac, Golden, CO: Fulcrum Publishing, 1991.



Student Learning Activities

1. After reading the legend, discuss the significance of the story behind the legend. You may wish to use the discussion questions on p. 101 in *Keepers of the Animals*. Here are some additional questions you can use:

   a. When Salmon Boy was being disrespectful to the salmon, what kind of circle did he break?

   b. What did Salmon Boy teach his people after he returned home?

   c. If you were Salmon Boy, what lesson would you teach?

   d. Using Native American designs and colors, draw a picture of a salmon. Use your imagination.

2. Show videos dealing with predator and prey, the food chain or food web, such as videos from National Geographic, Walt Disney, Nova or the Discovery Channel.

3. After showing, discuss the importance of the food chain and/or food web with the students. Emphasize that the greater the diversity of plant life in an area, the greater the diversity of animal life in the same area.

4. Following the discussion, introduce the vocabulary words you would like the students to know. Discuss the meanings of the words and have the students give examples of each of the following:

   prey
   predator
   parasite
   producer
   consumer
   omnivore
   herbivore
   carnivore

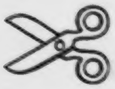
5. Play a survival game. Divide the class in half. One half of the students will be deer while the other half will be plants, water or trees. The students who are the deer should turn around so they will not see the other half of the class. The other group will decide, individually, which one they will be: the water, plants or trees. Instruct the deer that they will need food or water, but only one deer can have that item. There is no sharing.

   On the count of three, the deer will turn around and go get their food or water. Any deer that does not get one of the necessities of life will die. They become part of the food, water and tree group. The students will see the cycles of life within the classroom playing this game. Continue for several rounds so that the class will understand the concept of competition for food and the survival of the fittest.

6. Discuss the food chain and the food web by giving several examples, then have the students give some examples of their own. Make sure to stress that a food chain always begins with the producers – plant life. When discussing food webs, be sure to stress that these are interrelated food chains which overlap each other. For example, consider the predator-prey relationship of plants, insects, mice, snakes and hawks.

7. Have the students construct their own food chain and food web mobiles, using the items listed below.

   string or yarn
   construction paper
   metal hangers
   wire cutters
   wire
   magazines
   newspapers
   scissors
   glue



8. After the mobiles are completed, have the students explain why they put the plants and animals in that order. Ask them to discuss the relationship between the plant and the animals in a natural cycle.

9. Have the students construct a food chain map to hang on the bulletin board in the classroom or in the hall.

10. Play the "Where's My Dinner?" Game:

    a. Divide the class into 3 groups. Each group will be a specific part of the food chain. You can use many different food chains. Here are 2 examples:

LOWER LEVEL	MIDDLE LEVEL	HIGHEST LEVEL
grasshopper	frog	smallmouth bass
mouse	coyote	mountain lion

    The lower-level and middle level animals need to wear flag football belts or strips of cloth to signify which group they are in.

    b. Give each student a sandwich bag with a line of tape 2" from the bottom to be used as a food pouch. Students in the role of the lowest animal on the food chain (herbivores) will be the only ones allowed to pick up the popcorn from the floor. They will collect as much of it as they can during the round while avoiding the animals above them in the food chain (enemies). If they are caught by an animal above them in the food chain, they will be eaten. They must give their food pouch to that person immediately and sit out for the rest of the round.

Explain that the middle level group of animals need to have at least 2" of popcorn in their food pouch to survive. The only way for them to get popcorn is by catching the animal below them on the food chain. If they do not have enough popcorn in their food pouch when the round is over, they will die of starvation. Also, explain that the highest animal on the food chain must have popcorn over the tape line to survive. They, too, must catch the animal below them in the food chain. If they do not have enough popcorn in their food pouch when the round is over, they will also die of starvation.

c. Record how many of each animal are still alive after each round.

d. Change the number of animals after each round to see how it differs.

e. Explain to the class that to have a balanced food chain at least 2 mice, 2 coyotes and 1 mountain lion must survive at the end of the cycle.

(Adapted from *Outdoor Biology Instructional Strategies*)

11. Have the students explain the meaning of the following statement by Chief Seattle:

> "Man did not weave the web of life; he is merely a strand of it. Whatever he does to the web, he does to himself."

Evaluation

Have the students write a short essay about the food chain and food web cycles, and the balance of nature.

Resources

Caduto, Michael and Joseph Bruchac, **Keepers of the Animals**, Golden, CO: Fulcrum, 1989.

American Indian Science and Engineering Society, National Science Foundation, **Science Activities for Teachers – A Collection of Lesson Plans**, 1987.

Outdoor Biology Instructional Strategies, Berkeley, CA: Regents Press of the University of California, 1979.

Developed by:

Diane Cleveland
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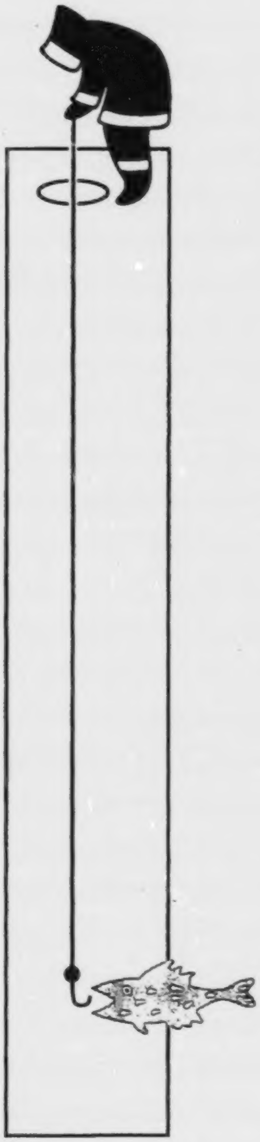


MATH AND SCIENCE

Stewards of the Earth

Teacher Background Information

There is an ongoing controversy on the Navajo Reservation between the Navajo Forest Industries and residents of the area and Navajo (Dine) CARE members. The Dine CARE organization and residents expressed concerns over logging practices, future forests and the overlooking of the cultural values of the Navajo people. Although President Zah declared 12,427 acres for wildlife, watershed protection, herb gathering and sacred sites this controversy is far from resolved. There are always going to be conflicts of interest between respecting Mother Earth and the need for jobs and revenue for the tribe.

Native Americans of the Northwest have petitioned for five salmon species to be declared endangered species. The decision on this petition and its economic impact will not be considered. In Alaska, the Alaskan Natives have voiced concerns over oil drilling in wildlife preserves which will threaten animal and plant habitats.

Various other tribes throughout the United States and Canada have voiced similar concerns over the depletion of wildlife and resources. The opposition of Native Americans to the destruction of animal and plant habitats, agricultural land, fishing waters and religious sites has gone unheeded by the federal government, tribal governments and industries.

Student Learning Activities

1. Brainstorm factors, other than humans, affecting the increase and decrease in animal population (i.e. migration, natural predator, dispersal, old age/death, accidents, climate, quality of food and water, available shelter and severity of weather).

2. Illustrate and design a large habitat mural with different animals that can be found near your school/community.

3. Divide students into predator and prey. Predator eliminates a prey. The prey then becomes a predator. If the predator has no more prey, it dies. The dead predators will have a certain place to be (encircled area).

   Make conclusions. What is the relationship between predator and prey?

Evaluation

Students will be evaluated on:

- Class participation
- Record in Learning Portfolio

Students will choose an endangered species of North America and research the animal or plant. Students will write a report which includes the name of the selected species, characteristics, survival habits, habitat, how it is being protected and illustrations.

Students will develop a class book on Endangered Species.

Materials

Reference books on local and national endangered species, dictionaries, illustrations of endangered species, butcher paper, crayons, markers, pencils, addresses of agencies, envelopes, writing paper, learning logs, portfolio, construction paper, computer with printer, book binder.

International Efforts – Endangered Species

Teacher Background Information

The need for wildlife and natural resource preservation is not confined to the borders of the U.S. The balance between human needs and wildlife is threatened from the tropical rainforest to the frozen tundra. The world's tropical forest is being depleted at a rapid rate. Efforts are being made to save many species of plants and animals.

There are many species yet to be identified and analyzed for potential use. In the Arctic region polar bears and seals are being slaughtered for their fur and tusk. The Convention on International trade in Endangered Species are making efforts to stop poachers by banning the sale of ivory, fur and plants. Plans are underway in Kenya to balance the survival of the wildlife habitats and human needs. Conservationists assert that to ensure the survival of wildlife, people must be able to benefit economically from the wildlife preserves and other conservation activities.

Student Learning Activities

1. Read "The Gifts of the Trees." Do birds live in the trees? Take a walk and list types of trees found in your community. List ways on how to care for and save trees, i.e. limit fire wood cutting, prevent forest fires and use fake Christmas trees.

2. Illustrate or cut a picture of an endangered species or a threatened species. On the back of the illustration write a note of gratitude and list steps you can take to save the species.

List of Endangered Species or Others You May Know of

- wood bison
- bald eagle
- beluga whale
- grizzly bear
- Aurora trout
- right whale
- eastern cougar
- piping plover
- red wolf
- desert wolf
- Kemp's ridley turtle
- spotted owl
- peregrine falcon
- prairie dog
- brown pelican
- humpback whale
- bowhead whale
- Eskimo curlew
- swift fox
- Everglade kite
- blue whale
- burrowing owl
- ivory billed woodpecker
- black footed ferret
- leatherback sea turtle
- hawksbill sea turtle
- American white pelican
- Arcadian whitefish
- gray timber wolf
- California condor
- woodland caribou

3. Research a favorite endangered species. Illustrate or cut picture from magazines and write a story. Display illustrations and stories separately. Have students read stories and match stories with correct illustrations.

4. Display a world map using illustrations and research information of endangered species. Pin the illustration on the border of the map and tie the string, run the color string to the appropriate area or region of the map. Secure the string with a pin.

Make a chart to show how many line segments, intersecting lines and parallel lines are used.

Evaluation

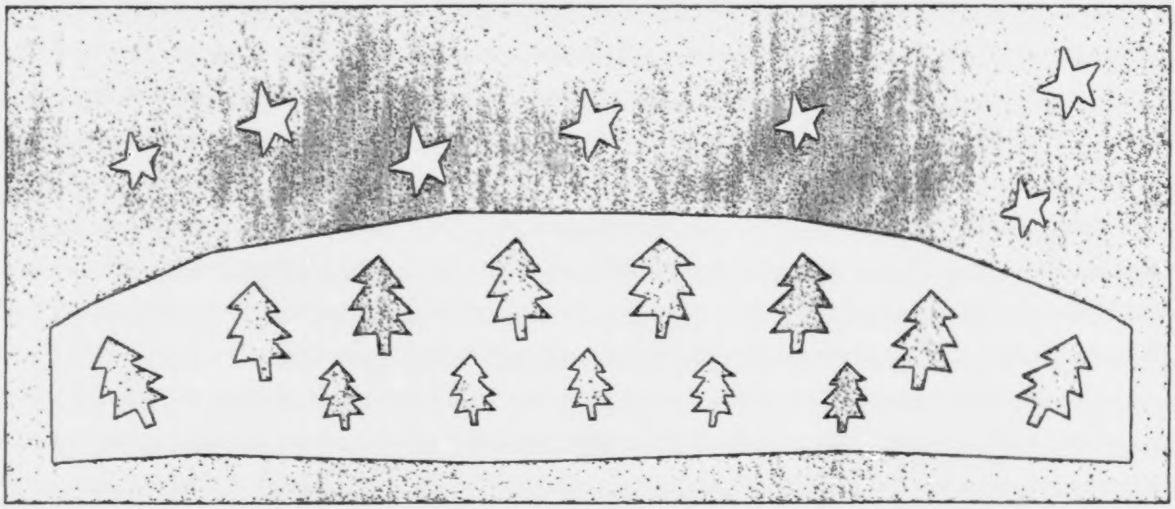
Students will be evaluated on:

Class participation
Record in Learning Portfolio

Students make conservation collage using pictures, captions and articles from magazines or newspapers or develop a conservation tips poster and display poster in the appropriate area.

Materials

A copy of "Gifts of the Trees" for each student, illustrations of endangered species, lists of endangered species, reference materials, magazines, newspaper, glue, scissors, poster boards, color strings, pins, world map, chart paper, learning log, portfolio holders, pencils, colored markers, crayons and construction paper.



"The Gifts of the Trees," an Indian Fable retold by Ann Hudson Downs (Winter issue 1993 of Wee Wisdom), MASINAIGAN, p. 22.

Many, many moons ago when Man first came to live on the earth, he looked at the vastness that surrounded him and a great loneliness filled his heart. "How shall I live?", he cried. "The world is so big and I am alone!"

The trees were glad the Great Spirit had sent Man to live among them and wanted to help him. "You are not alone. We are your brothers and we will help you," they murmured softly. Man felt comforted.

The maple tree touched him with her tender branches. "I will give you sweet water to drink and to make into sugar," she said.

The hickory tree shook a host of nuts from his tall branches. "See? I will give you food to satisfy your hunger." "We will help," spoke up the hickory tree's cousins, the chestnut, the beech and the walnut.

"Then you will need baskets," said Goungah, the elm tree. "Make them with my soft bark and strengthen them with thongs of my tough muscles."

Now there was happiness in the heart of Man as he set out to explore the world for he had food and drink and friends. But soon a wide river blocked his trail. "Alas, I can go no further!", he cried.

Wigwass, the birch tree grew near the great river and heard his cry. "I will help you, my brother," she called. "Take strips of my skin and tie them together with the tough thongs given to you by the elm tree. Then you will have a canoe strong enough to carry you across the wide rivers."

Man did as Widwass suggested and soon the fearful river was behind him. But in the meantime the sun had entered his lodge on the west. Man shivered with cold.

This time it eyed the balsam who saw her brother's need. "Do not suffer cold," she said. "In my heart there is much sunfire. Rub my branches together and they will give you sparks to kindle a flame."

Man followed balsam's instructions and soon a great campfire roared before him. When he was warm his eyes grew heavy with sleep.

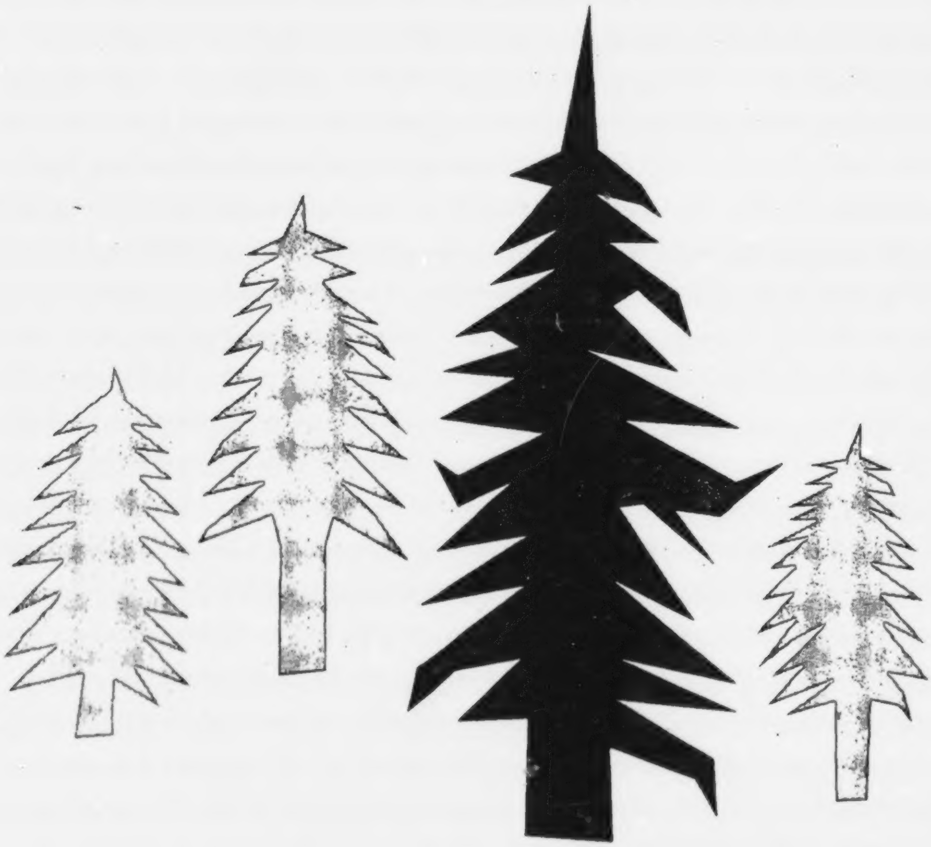
"It's our turn to help," spoke the great pine and the cedar. And they shook a mound of sweet smelling needles beside Man. He spread them into a soft bed and slept.

All through the long night North Wind blew his icy breath over him. But Man rested warm and secure until Wabun, the east wind chased the darkness down the valley and brought the morning to Man's campfire.

When he awoke there was a great gratitude in his heart. "How can I repay you for your kindness?", he asked the trees.

"We want no pay,", they replied. "Giving is the secret of our happiness. We only ask that you use the gifts of the forest wisely. Never waste or destroy what the Great Spirit has given freely to his children."

Indians have never forgotten. They take only what they need and leave the rest for others.



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2. Bjerklie, David. "Endangered Species Act and its Discontents". Technology Review, May/June 1992: p. 19.
3. Caduto, Michael J. & Bruchac, Joseph. *Keepers of the Animals*, Fulcrum Publishing, Golden, CO. 1991: pp. 223-243.
4. Cohn, Jeffery P.. "Decisions at the Zoo", Bio Science Vol. 42 No. 9, October 1992: pp. 654-659.
5. Corn, M. Lynne. "The Endangered Species Act; The Storm's Eye". Washington Watch, October 1990: p. 627.
6. Davis, Phillip A.. "Upstream Battle for Survival Draws Support for Salmon". Environment, March 9, 1991: pp. 602-603.
7. Down, Ann Hudson, "The Gifts of the Tree", MASINAIGAN, Winter 1993: p. 22.
8. Kaplan, Kim J. "Bring 'Em Back Alive and Growing", Agricultural Research, July 1991: pp. 4-12.
9. McDowell, Jeanne & Seldeman, David. "The Landlord", TIME, March 8, 1993: p. 38.
10. Valerie, Taliman, "Logging Issue Hits Compromise State", Navajo Times Vol. XXXII, August 13, 1992: pp. 1-A8.
11. "Protecting Endangered Species Look Like a Losing Battle", MASINAIGAN, Winter 1993: p. 1.

My Ideas for Birds Unit:

Lesson Plans/Schedule for Birds Unit

Nursery Rhymes and Poems

Sing a song of sixpence
A pocket full of rye;
Four and twenty blackbirds
Baked in a pie.

When the pie was opened,
The birds began to sing;
Wasn't that a dainty dish
To set before the king?

The king was in his countinghouse,
Counting out his money;
The queen was in the parlor,
Eating bread and honey.

The maid was in the garden
Hanging out the clothes,
When down came a blackbird
And nicked off her nose.

Hickety, pickety, my black hen,
She lays eggs for gentlemen;
Sometimes nine and sometimes ten,
Hickety, pickety, my black hen.

The Chickens
What a dreadful battle,
What a dreadful storm!
Five little chickens
Fighting for a worm.

When the worm had vanished
They all said – Peep – and then
The five little chickens
Were all good friends again.

Ducks' Ditty

All along the backwater,
Through the rushes tall,
Ducks are a-dabbling
Uptails all!

Ducks' tails, drakes' tails,
Yellow feet a-quiver,
Yellow bills all out of sight
Busy in the river.

Everyone for what he liked,
We like to be
Heads down,
tails up,
Dabbling free!

At the edge of the cornfield
a bird will sing with them,
it will sing with them
in the oneness of happiness
and the hearts of the people
will be filled with thanksgiving.

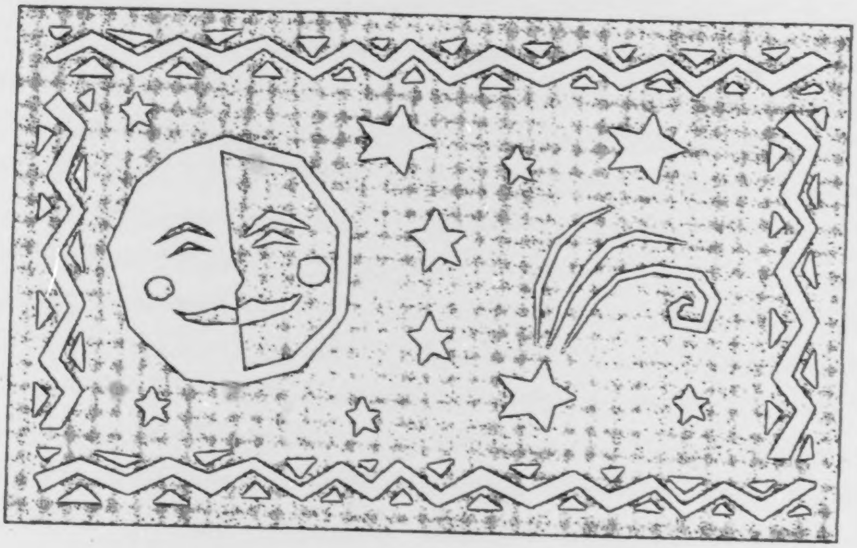
So the people and the bird
will sing together
in tune with the universal power
in harmony with the one Creator.

The birdsong and the people's song
and the song of life
will become one.

– Southwest

The teacher should have the students do choral readings of these selections, memorize and recite them, and explain what they mean in their own words. These can be used to stress phonemic awareness and beginning sounds/ending sounds, rhyming words in kindergarten and other word-attack principles such as the ing sound, long and short vowel sounds, compound words, r-controlled vowels, at the first grade on up levels.

Sun, Moon & Stars



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Background Information for Teachers and Parents

Phases 2 and 3

Indian people a long time ago studied the sun, moon and stars and told stories that emphasized certain noted phenomena. One such story follows.

Legend of the Sun

A long time ago, the sun used to travel faster than it does now. Indian medicine men were considering how they could make it go slower. A fox came along and paid close attention to what they were saying. He sat quite still and thought it all over. Then he said to himself, "I will go with the sun tomorrow and see if I can make him go slower."

The next morning he asked the sun if he might travel with him, but the sun said, "No, I know your sly tricks, Mr. Fox; you cannot travel with me." But the fox followed him, and after awhile the sun said he could travel with him.

When they reached the halfway line, the fox said he was tired and wanted to rest a moment. The sun said, "All right." And the fox lay in the shade with his tail stretched out between two trees where the sun could see it. He told the sun to call him when he was ready to go on.

The sun stood quite still for a little while; then he called to the fox to come on. There was no answer. He called again. There was still no answer. So he looked to see what was the matter. He suspected the fox had played a trick on him. He thought he still saw the tail between the trees, but upon looking closer, found it was only a goose's feather, which the fox had placed there to deceive him. The fox was gone – so he went on the rest of the way alone.

The next day, when the medicine men looked at the sun, they noticed that he stopped when he got to the middle of the sky, just as the fox had tricked him into doing the day before.

Ever since then, the sun stops at that time of the day and travels slower, looking for the fox. The medicine men gave great credit to the fox for making the sun move slower.

* * * *

Your children are going to read Indian and other stories about the sun, moon and stars. From these stories they will learn science and math, reading, writing, speaking and listening, and will also learn lessons about life.

Background Information for Teachers and Parents

Phases 4 and 5

Observatories 2,500 Years Old

– ORBIS Associates

At a site in Wyoming known as Bighorn Medicine Wheel, astronomer John A. Eddy deciphered the arrangement of what appears from the air to be a giant wheel, with spokes made of stones. Dr. Eddy observed and measured how various combinations of the outer ends of the Bighorn spokes line up to mark the rise and setting of three bright stars which precede it.

Dr. Eddy, working at the Smithsonian Center for Astrophysics at Harvard University, located other similar solar observatories built by "different people at different times." He has tracked down a series of such wheels dotted around southern central Canada and along the eastern slopes of the Rocky Mountains. He has hinted that spokes in many of the wheels pinpoint the summer solstice and that often a wheel will point to another wheel nearby.

In the Hoven Weep site, just west of Mesa Verde, Colorado, Dr. Ray Williamson, assistant dean at St. Johns College in Annapolis, Maryland, has measured the astronomical orientation of ports in the walls of towerlike structures built by the ancestors of the Pueblo Indians. The ports, or apertures, he says, are oriented in the wall in such a way as to admit the sun only on the winter and summer solstices. Built about the year 1100, Dr. Williams says that the structures show that the Anasazi Indians had a "sophisticated" knowledge of the sun and the planets.

At Cahokia, in East St. Louis, Illinois, Dr. Warren Wittry has explained an extensive series of post holes in the once-thriving Indian capital that dates back to the 11th century. The holes describe four large circles – one is 410 feet in diameter – which, Dr. Wittry's work indicates, may have been used for the same calendar-like purpose that Stonehenge is thought to have served.

"With no everyday need for astronomy in the modern world," says Dr. E. C. Krupp, Director of the Griffith Observatory in Los Angeles, "we may have a hard time realizing today how much prehistoric peoples watched, and relied upon, the sky." "It's a story," says Dr. Eddy, "which just hasn't been unraveled. But there is more and more evidence that they were all looking at the sky and studying it...We are just scratching the surface."

These are all things your children should know.

Suggested Primary Level Unit Outline – Sun, Moon & Stars

Reading, Language Arts, Science, Math, Art, Values	Literature – Week 1	Literature – Week 2
P Sun, Moon & Star Words H Reading Legends/Myths A Retelling/The Oral Tradition S Comparing/Contrasting E Research/Verifying Memorizing/Reciting Constellations F Stargazing/Planets I Size of Earth/Sun V Miles/Kilometers E Constellation Maps Sacrifice to Benefit Others	*Her Seven Brothers* by Paul Goble "How Grizzly Climbed the Mountain" in *Keepers of the Animals* by Caduto & Bruchac Star Song – Passamaquoddy "How Fisher Went to the Skyland" in *Keepers of the Animals*/Caduto & Bruchac "Seven Pima Stars" in *And It Is Still That Way* by Byrd Baylor	*Stars of the First People* by Dorcas S. Miller *They Dance in the Sky* by J. Monroe/R. Williamson *Star Tales* and *More Star Tales, North American Indian Stories* by G. Mayo *American Indian Star Tales* by L. Moroney *The Earth Under Sky Bear's Feet* by Bruchac & Locker
P Sun, Moon & Star Words H Reading Nonfiction/Legends A Memorizing/Reciting S Comparing/Contrasting E Summarizing/Responding Number/Distance to Stars F Sun is Star/Seasons O Hundred/Thousand/Million U Draw Stars/Shapes/Calendars R Respect for Gifts/Differences	*Do You Know About Stars?* by Mae Blacker Freeman *The Sun* by Seymour Simon *The Sun, Our Very Own Star* by Jeanne Bendick Songs by Edgar Red Cloud and Black Elk in *Star Boy* by Paul Goble Eskimo Chant – Rasmussen	*The Legend of Scarface* by Robert San Souci *Star Boy* by Paul Goble *Thirteen Moons on Turtle's Back* by Joseph Bruchac *Moonstick: Seasons of the Sioux* by Bunting/Sandford *Full Moon Stories* by Eagle Walking Turtle
P Sun, Moon & Star Words H Reading Nonfiction/Legends A Retelling/Memorizing S Comparing/Contrasting E Summarizing/Reporting Gifts from the Sun T Photosynthesis H Day & Night/Dark & Light R 24 Hours E Growing a Plant E Concern for Self/Others	*Raven: Trickster Tale* by Gerald McDermott *The Day Sun Was Stolen* by Jamie Oliviero *How the Sun Made a Promise and Kept it* by Bernstein/Kobrin *Grandmother Spider Brings the Sun* by Geri Keams "How Grandmother Spider Stole the Sun" in *Keepers of the Earth* by Caduto & Bruchac	*Arrow to the Sun* by Gerald McDermott Arrows – Shel Silverstein *Dream Feather* by Viento Stan Padilla Shadow Race – Silverstein *Energy from the Sun* by Allan Fowler *Sun Up, Sun Down* by Gail Gibbons
P Sun, Moon & Star Words H Reading Legends/Poems A Retelling/Memorizing S Comparing/Contrasting E Listening/Responding Day and Night Wondering/Observing T Sun, Moon & Stars W Color/Cut/Count Stars O Caring for Others	Twinkle, Twinkle, Little Star *Twinkle, Twinkle, Little Star* by Iza Trapini Somebody Has To – Silverstein *Coyote Places the Stars* by Harriet Peck Taylor *Coyote in Love with a Star* by Marty Kreipe de Montana *How the Stars Fell into the Sky* by Jerri Oughton	*What the Sun Sees, What the Moon Sees/* by N. Tafuri *Following the Sun* by Jenny Stow *Sun Song* by Jean Marzallo *Sun, Shine* by Carol Greene *Papa, Please Get the Moon for Me* by Eric Carle *Happy Birthday, Moon* by Frank Asch

Literature – Week 3	Literature – Week 4	Reading, Language Arts, Science, Math, Art, Values
People Who are Stars *Jim Thorpe* by Edward Rivinus *Tallchief* by Maria Tallchief *A Boy Called Slow* by Joseph Bruchac *Wilma P. Mankiller: Chief of the Cherokee Nation* by Charnan Simon *Black Elk: A Man With a Vision* by Carol Greene	*A Picture Book of Martin Luther King, Jr.* by David A. Adler *Rosa Parks* by Eloise Greenfield *Girls Can Be Anything* by Norma Klein *Helen Keller* (or others) by David A. Adler *Roy Campanella* (or others) by Carol Greene	Star People Attributes Words Reading Biographies Comparing/Contrasting Retelling/Rewriting Writing "I Want to Be ___" Research/Writing Biography of Local Star Person Illustrating Local Biography Change, Cycle of Life Varying Views Respect for Gifts/Differences Accomplishments
Seasons/Weather *The Earth and the Universe: How the Sun, Moon & Stars Cause Changes on Earth* by Miguel Perez *Sky and Weather* by Alan Ward *Weather* by Seymour Simon	Spring Defeats Winter in *Keepers of the Earth* by Caduto and Bruchac *Did You Hear the Wind Sing Your Name? Oneida Song of Spring*/S. DeCoteau Orie *The Summer Maker* by M. Bernstein & J. Kobrin *Last Leaf First Snowflake to Fall* by Lee Yerxa	Sun, Moon & Star Words Reading Nonfiction/Legends Retelling/Responding Summarizing/Reporting Change, Cycle of Life Seasons/Weather Rain/Ice/Snow Season Suite – Bruchac Make Ice Cream/Measuring Responding to Change
The Moon *Moon and Otter and Frog* by Simms and Brycela *The Angry Moon* by W. Sleator *Rabbit and the Moon* by Douglas Wood "Creation of the Moon" in *Keepers of the Night*/Bruchac "How Coyote Was the Moon" in *Keepers of the Earth* by Caduto Bruchac	*I'll Catch the Moon* by Nina Crews Moon CatchinNet – Silverstein *So That's How the Moon Changes Shape* by Allan Fowler *Sometimes Moon* by Carol I. Schaefer *The Moon Seems to Change* by Franklin M. Branley	Sun, Moon & Star Words Reading Legends/Nonfiction Retelling/Memorizing Summarizing/Reporting Transcribing Poems/Illustrations Observing Moon Phases Surface/Walk on Moon Day and Night/24 Hours Calendar Days Paper Mache Moons/Bruchac Consequences/Changing
Daily Activities *Giving Thanks, A Native American Good Morning Message*/Swamp & Printup *Day and Night* by Nedra Emery *Northwoods Cradle Song* by Douglas Wood *Dreamcatcher* by Audrey Osofsky	*Time to Get Up!* by S. Hellard *Wake Up, Little Children* by Jim Aylesworth *My Day* by Debbie Mackinora *Goodnight Moon* by M.W. Brown *Good Night, Gorilla* by Peggy Rathman	Daily Activities Words Memorizing/Retelling Listening/Responding Writing Schedules Writing "I Like ___" Day and Night/Time Prisms/Light/Colors Drawing Rainbows Daily Responsibilities/Daily Renewal

About the Literature for Phase Five

Indian people have always been very interested in the stars and knew a great deal about them even long ago. Tribes have their own star names and star stories.

Star Stories

Her Seven Brothers by Paul Goble, Aladdin Paperbacks, Simon and Schuster, 1988. **Cheyenne**, also included in a collection book, Paul Goble Gallery, with *The Gift of the Sacred Dog* and *The Girl Who Loved Wild Horses,* Aladdin Paperbacks.
How Grizzly Climbed the Mountain in *Keepers of the Night* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, Inc., 1994. **Shoshone**
Star Song in *Stars of the First People* by Dorcas S. Miller, Pruett Publishing, 1997, Page 43. **Passamaquoddy Also found in some basal readers.**
How Fisher Went to the Skyland in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (Indian Author), Fulcrum, Inc., 1988. **Anishinabe** Also on audio tape.
Seven Pima Stars in *And It Is Still That Way* by Byrd Baylor, Trails West Publishing, 1976. **Pima Also found in some basal readers.**

These are four stories from different tribes about the seven stars that form the Big Dipper and one about the seven stars that form the Pleiades (dancing brothers). Stories selected can be read or listened to by all or assigned to different students. Some are very short. They can be compared and contrasted.

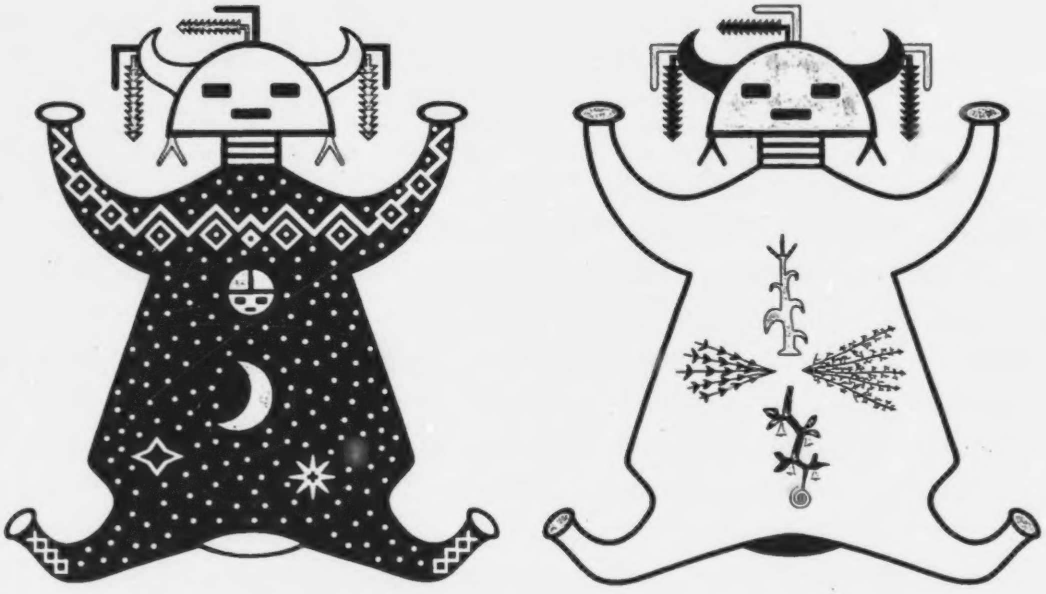
Student Research

Stars of the First People by Dorcas S. Miller, Pruett Publishing, 1997.
They Dance in the Sky, Native American Star Myths by Jean G. Monroe and Ray A. Williamson, Houghton Mifflin, 1987.
Star Tales, North American Indian Stories by Gretchen Mayo, Walker & Co., 1987.
More Star Tales, North American Indian Stories by Gretchen Mayo.
American Indian Star Tales by L. Moroney, Feathermoon. Also on audio tape.

These materials are higher reading level, but students can find stories from tribes of their choosing or from their own tribes that they can read or listen to and possibly transcribe and illustrate to present to their parents or others to verify authenticity. Add other local star stories.

Star Poetry

The Earth Under Sky Bear's Feet by Joseph Bruchac (**Indian Author**), Putnam & Grosset Group, Paperstar, 1995. Twelve poems that tell of what Sky Bear (the Big Dipper) sees and hears. **Mohawk, Anishinabe, Pima, Missisquoi, Winnebago, Cochiti, Pueblo, Lenape, Chumash, Inuit, Lakota, Navajo, Pawnee** Students should pick or be assigned poems to memorize, recite to audiences, transcribe and illustrate.



People Who Are Stars

Jim Thorpe by Edward F. Rivinus. Biography of an Indian athlete. **Sac & Fox**
Tallchief, America's Prima Ballerina by Maria Tallchief with Rosemary Wells. **Osage**
A Boy Called Slow by Joseph Bruchac (Indian Author). About Sitting Bull. **Lakota**
Wilma P. Mankiller: Chief of the Cherokee Nation by Charnan Simon. Biography of woman chief of today. Available from National Women's History Project, Windsor, CA. **Cherokee**
Black Elk: A Man With a Vision by Carol Greene, Children's Press, 1990. Biography of a medicine man. **Lakota**
A Picture Book of Martin Luther King, Jr. by David A. Adler, Holiday House, 1989. **Found in some basal readers.**
Rosa Parks by Eloise Greenfield. Available from National Women's History Project, Windsor, CA.
A Picture Book of Helen Keller (or others) by David A. Adler, Holiday House
Girls Can Be Anything by Norma Klein, E.P. Dutton, 1973. **Found in some basal readers**
Roy Campanella (or other Rookie Biographies) by Carol Greene, Children's Press.

There are five biographies of Indian people, four of others and a book motivating girls. Each child should read or hear at least one Indian biography and one other biography.

About the Literature for Phase Four

Indian people hold a reverence for the sun, moon and stars which are included often in tribal stories and songs that reference nature's cycles and seasonal changes.

Sun, Moon and Stars

Do You Know About Stars? by Mae Blacker Freeman, Random House, 1970. Nonfiction about number of and distance to stars. **Found in some basal readers**
The Sun by Seymour Simon, Mulberry, 1989. Nonfiction close-up of the sun.
The Sun, Our Very Own Star by Jeanne Bencick, Millbrook Press, 1991.
All students can read or hear all books selected or the books can be assigned to various students. Facts from these books should be summarized, reviewed and reported.

Songs by Edgar Red Cloud and Black Elk (**Indian Authors**) in *Star Boy* by Paul Goble, Bradbury Press, 1983. **Lakota** Songs (poems) of reverence for the sun.
Eskimo Chant, Knud Rasmussen, translator. **Found in some basal readers.**
These songs could be memorized by all students.

The Legend of Scarface by Robert San Souci, Zephyr Books, 1978. **Blackfeet**
Star Boy by Paul Goble, Bradbury Press, 1983. **Blackfeet** Also on audio tape.
These two books are versions of the same legend. They can be compared and contrasted.

Thirteen Moons on Turtle's Back by Joseph Bruchac (**Indian Author**), Paperstar, 1992.
Moonstick: Seasons of the Sioux by Bunting and Sandford, Harpercollins, 1999. **Lakota**
Full Moon Stories by Eagle Walking Turtle, Hyperion, 1997. **Indian**
These books are poetic expressions of the thirteen cycles of the moon and the changing seasons. The class should learn the local Tribal cycles of the moon.

Seasons/Weather

The Earth and the Universe: How the Sun, Moon and Stars Cause Changes on Earth by Miguel Perez, Barrons, 1998.
Sky and Weather by Alan Ward, Franklin Watts, 1993.
Weather by Seymour Simon, Harpercollins, 2000.
Nonfiction books about seasons and weather. Facts from these books should be summarized, reviewed and reported.

Spring Defeats Winter in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, Inc., 1998. **Seneca** Also on audio tape.
Did You Hear the Wind Sing Your Name? ***Oneida*** *Song of Spring* by S. Decoteau Orie (**Indian Author**), Walker Books.
The Summer Maker: An ***Ojibway*** *Indian Myth* by Margery Bernstein and Janet Kobrin, Scribner, 1977.
Last Leaf First Snowflake to Fall by Lee Yerxa, Orchard, 1994. **Indian**
Indian stories about seasons and weather. They should be retold. Add local stories about seasons and weather.

About the Literature for Phase Three

Indian people have always been interested in the sun, moon and stars which are included in many of their legends. The legends also teach lessons.

Sun Stories

Raven: Trickster Tale by Gerald McDermott, **Northwest**
The Day Sun Was Stolen by Jamie Oliviero, Hyperion, 1995. **Haida**
How the Sun Made a Promise and Kept It by Margery Bernstein and Janet Kobrin, Scribner, 1974. **Yana-California**
Grandmother Spider Brings the Sun by Geri Keams (**Indian Author**), Northwest Press, 1995. **Cherokee**
How Grandmother Spider Stole the Sun in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (Indian Author), Fulcrum, Inc., 1998. **Creek** Also on audio tape.
These are stories about how various tribes acquired the sun. Selected stories can be read or listened to by all or assigned to different students. They can be compared/contrasted. Students should ask their families if they have stories about the sun and retell them at school. Add local stories about the sun.

Arrow to the Sun by Gerald McDermott, Viking, 1974. **Pueblo** Also a film.
Arrows and Shadow Race in *A Light in the Attic* by Shel Silverstein, Harper & Row, 1981.
Dream Feather by Viento Stan Padilla (**Indian Author**), Book Publishing Co., 1987.
Two of these are stories about acquiring the spirit of the sun and strength for self and the people. The poem Arrows is about shooting an arrow to the sky as in *Arrow to the Sun.*

Energy from the Sun by Allan Fowler, Children's Press, 1998.
Sun Up, Sun Down by Gail Gibbons, Harcourt Brace, 1983.
These two pieces are nonfiction about the sun. The main ideas should be summarized.

Moon Stories

Moon and Otter and Frog by Simms and Brycela, Hyperion, 1995. **Modoc**
The Angry Moon by William Sleator, Little, 1970. **Tlingit**
Rabbit and the Moon by Douglas Wood, Simon and Schuster, 1998. **Cree**
How Coyote Was the Moon in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Inc., 1988. **Kalispell-Idaho** Also on audio tape.
Creation of the Moon in *Keepers of the Night* by Bruchac (**Indian Author**) **Navajo**
These are Indian legends that include the moon. Selected stories can be read or listened to by all or assigned to various students or groups and retold. Add local stories about the moon.

So That's How the Moon Changes Shape by Allan Fowler, Children's Press, 1991.
The Moon Seems to Change by Franklin M. Branley, Harper, 1987.
Sometimes Moon by Carol L. Schaefer, Crown, 1999.
The first two are nonfiction science-oriented books about the phases of the moon. The last one is more poetic about the phases of the moon and could lead to an art project.

I'll Catch the Moon by Nina Crews, Greenwillow, 1996.
Moon Catchin' Net in *A Light in the Attic* by Shel Silverstein, Harper & Row, 1981.

About the Literature for Phase Two

Indian people respect the gifts of the sun, moon, stars, and day and night. Indian stories and songs often reference the sun, moon and stars.

Sun, Moon and Stars

Twinkle, Twinkle, Little Star – poem (song)
Twinkle, Twinkle Little Star – by Iza Trapini, Whispering Coyote Press, 1997.
Somebody Has To in *A Light in the Attic* by Shel Silverstein, Harper & Row, 1981.
Twinkle, Twinkle, Little Star is included because most children learn it, sometimes even before they come to kindergarten. The students can start by being able to recognize some of the words. The book takes the poem further.

Coyote Places the Stars by Harriet Peck Taylor, Aladdin, 1993. **Wasco**
Coyote in Love with a Star by Marty Kreipe de Montano (**Indian Author**), Abbeville Press, 1998. **Navajo**
How the Stars Fell into the Sky by Jerri Oughton, Houghton Mifflin, 1992. **Navajo**
These Indian legends all involve the stars. They can be compared and contrasted. Add local stories about the stars.

What the Sun Sees, What the Moon Sees by Nancy Tafuri, Greenwillow, 1997.
Sun, Shine by Carol Greene, Children's Press, 1983.
Sun Song by Jean Marzallo, Harpercollins, 1995.
Following the Sun by Jenny Stow, Carolrhoda Books, 1997.
Papa, Please Get the Moon for Me by Eric Carle
Happy Birthday, Moon by Frank Asch, Simon and Schuster, 1985.
These are general children's books regarding a fascination with the sun and moon.

Daily Activities

Giving Thanks, A Native American Good Morning Message by Chief Jake Swamp (**Indian Author**), Holiday House. **Mohawk**
Day and Night by Nedra Emery, Salina Bookshelf, 1996. **Navajo**
Northwoods Cradle Song by Douglas Wood, Aladdin, 1998. **Menominee**
Dreamcatcher by Audrey Osofsky, Orchard Books, 1992. **Ojibway**
These books have to do with daily rituals and activities and are Indian-oriented.

Time to Get Up! by Susan Hellard
Wake Up Little Children by Jim Aylesworth
My Day by Debbie Mackinora, Little Brown & Co., 1999.
Goodnight Moon by M.W. Brown, Harpercollings, 1997.
Good Night, Gorilla by Peggy Rathman
These books are general about daily routines.

Selected materials can be read to all students or certain materials can be assigned for some students. Some of the materials should be read over until they are memorized to facilitate beginning word recognition.

Further Resources for Sun, Moon and Stars Unit

These materials can be used to substitute for books in the suggested unit outline or for additional reading/other activities for students.

Finding Out About Sun, Moon and Planets by Lynn Myring, 1983.

Earth: The Gateway Solar System by Gregory Vogt, 1996.

Children of the Sun by Arthur J. L'Hommedieu, Child Play Inc., 1994.

The Moon, the Sun and Coyote by J. Cole, Simon & Schuster, 1991. **Indian**

Why the Sun and Moon Live in the Sky by Elphinstone Dayrell, Houghton Mifflin, 1990. **Included in some basal readers.**

Native American Stories by Joseph Bruchac (**Indian Author**). Includes the same stories as in Keepers of the Earth.

All On Earth, Musical Companion to Keepers Books, performed by Michael Caduto.

The Daughter of the Sun (**Cherokee**), The Girl Who Married the Star (**Lakota**), and The Man Who Married the Moon (**Pueblo**) in Favorite North American Indian Legends by Philip Smith, Dover, 1994.

I Can Read About the Sun and Other Stars by Richard Harris, 1996.

Clyde and Susanna, The Sun Who Always Loved Her Shine by Kymberli Dyson, Little Light, 1998.

How Raven Stole the Sun by Maria Williams, National Museum of the American Indian

Sunpainters: the **Navajo** Sun by Baje Whitethorne (**Indian Author**), Northland Press.

How Snowshoe Hare Rescued the Sun by E. & D. Bernhard, Holiday House, 1993. **Indian**

Monster Slayer by Vee Brown (**Indian Author**), Northland Press. **Navajo**

Monster Birds by Vee Brown (**Indian Author**), Northland Press. **Navajo**

Look at the Moon by May Garelick, Mondo, 1996.

And if the Moon Could Talk by Kate Banks, Farrar Straus & Giroux, 1998.

Cabbage Moon by Tim Chadwick, Orchard Books, 1994.

The Best Book of the Moon by Ian and Aan Graham, 1999.

Night Comes by Beatrice Schenk de Regriers **Included in some basal readers.**

Moongame by Frank Asch **Included in some basal readers**

Brave Eagle's Account of the Fetterman Fight by Paul Goble. **Lakota** A battle takes place on the night the moon is closest to the earth.

How Raven Freed the Moon by Anne Cameron, 1997. **Indian**

Full Moons: **Indian** Legends of the Seasons by Lillian Budd

Snow Moon, Wild Goose Moon and Wild Rice Moon, Circle Program, Fitzhenry & Whiteside, 1988. **Indian**

Keeping Track of Time in Signs of Tradition: Native American Lessons, Master's Project, University of Kansas, 1994. **Mayan and Mandan**

Coyote Concert on a Full Moon Night by Carol Whelchen-Scherer, 1998.

Full Worm Moon by Margo Lemieux. **Algonquin**

The Wish Wind by Peter Eyvindson, Pemmican Pub., 1987.

Little Herder Books by Ann Nolan Clark, Bureau of Indian Affairs. Little Herder in Summer, in Winter, in Spring, in Autumn. **Navajo**

Circle of Seasons by Ann Nolan Clark, Bureau of Indian Affairs. **Pueblo**

How Thunder and Lightning Came to Be by Beatrice Harrell (**Indian Author**), Dial. **Choctaw**

The Hero Twins and the Swallower of Clouds in Keepers of the Earth by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, Inc. 1988. **Zuni**

Snow and Ice by Keith Lye, Raintree, 1994.

Wind and Rain by Claire Llewellyn, Barron's, 1995.

The Science Book of Weather by Neil Ardley, Harcourt Brace, 1992.

Weather Experiments by Vera Webster, Children's Press, 1989.

Red Hawk and the Sky Sisters, A **Shawnee** Legend by Gloria Dominic, Troll, 1996.

Number the Stars by Lois Lowry, Houghton Mifflin, 1990.

Lakota Star Knowledge by Ronald Goodman, Sinte Gleska University, 1992.

The Stars in Old Father Storyteller by Pablita Valarde (**Indian Author**), Clear Light Pub., 1989. **Pueblo**

The Dancing Stars: An **Iroquois** Legend by Anne Rockwell, Crowell, 1972.

Star Maiden by Barbara Edensen, Little, Brown, 1988. **Ojibwa**

Follow the Stars: A Native American Woodlands Tale by Kristina Rodanas, Cavendish, 1998. **Ojibwa** (How Fisher Became the Big Dipper)

Murdo's Story: A Legend from Northern Manitoba by Murdo Scribe (**Indian Author**), Pemmican Pub. (How Fisher Became the Big Dipper)

Oot-Kwah-Tah, The Seven Star Dancers in Keepers of the Night by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1994. **Onondaga**

The Lost Children by Paul Goble, Bradbury Press, 1993. (The Pleiades) **Blackfeet**

Coyote in Love by Mindy Dwyer, Alaska Northwest Books, 1997. **Indian**

Lift the Sky Up: A **Snohomish** Indian Legend by Richard Vaughn, 1995.

How the Milky Way Got Into the Sky (**Warm Springs**), How the Morning and Evening Stars Came to Be (**Assiniboine**), How Daylight Came to Be (**Skokomish**), Educational Systems, Inc.

The Story of the Milky Way by Joseph Bruchac and Gayle Ross (**Indian Author**), Dial Books. **Cherokee**

Skywoman: Legends of the **Iroquois** by Joanne Shenandoah (**Indian Author**), and D. George, Clear Light, 1998.

Star Stories by Linda Skinner (**Indian Author**).

Stars in **Navajo** Tales

Earth and Sky by R.A. Williamson **Indian**

On the Road of Stars by J. Bierhorst, Macmillan, 1994. **Indian**

Wilma Mankiller by Gini Holand, 1997. **Cherokee**

Wilma Mankiller by Jacki Thompson Rand. **Cherokee**

Crazy Horse's Vision by Joseph Bruchac (**Indian Author**). **Lakota**

Maria Tallchief by Heidi Ellen Erdrich. **Osage**

Will Rogers, American Humorist by Peter Anderson. **Cherokee**

Wilma Rudolph by Victoria Sharrow, Carolrhoda Books, 2000.

A Picture Book of Sitting Bull by David Adler, Holiday House. **Lakota**

"Guardian of Traditions" in Signs of Tradition, University of Kansas, 1994. **Lakota**

I See the Moon: Good-Night Poems and Lullabies by Marcus Pfister, 1996.

Putting the World to Sleep by Shelley Moore Thomas, Houghton Mifflin.

Good Morning, Good Night by Carmel O'Mara, Red Wagon, 1997.

The Way to Start a Day by Byrd Baylor.

A Child's Good Morning Book by Margaret Wise Brown, Harpercollins, 1996.

A Child's Good Night Book by Margaret Wise Brown, Harpercollins, 1992.

Morning, Noon and Night by Jean Craighead George, Harpercollins, 1999.

Time for Bed by Mem Fox, Gulliver, 1993.

The Going to Bed Book by Sandra Boynton, Little, 1982.

Grandmother's Dreamcatcher by Becky Ray McCain, Albert Whitman & Co., 1998. **Ojibwa**

The Boy Who Loved Morning by S. K. Jacobs, Little, Brown, 1993. **Indian**

Weave Little Stars Into My Sky by Neil Philip (**Indian Children's Lullabies**)

Mama, Do You Love Me? by Barbara M. Joosse, Chronicle Books, 1991. **Alaskan**

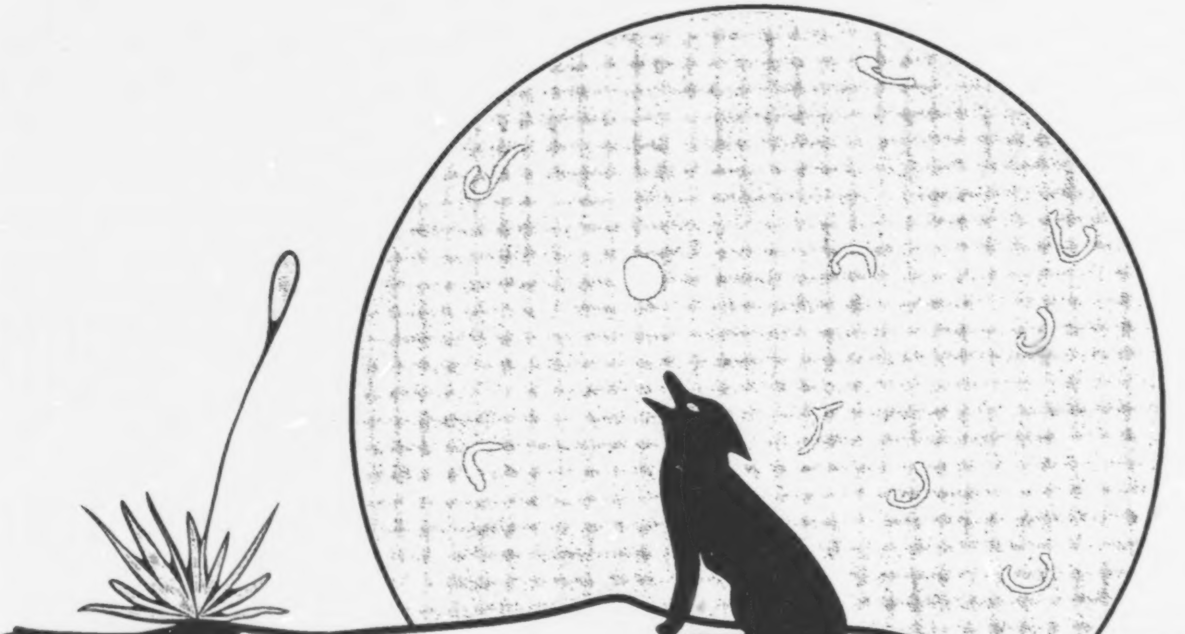
The Christmas of the Reddle Moon by J. Patrick Lewis, Dial Books, 1994.

Grandmother's Christmas Story by Richard Red Hawk (**Indian Author**)

Circle of Wonder, A **Native American** Christmas Story by N. Scott Momaday (**Indian Author**), Clear Light Publishing, 1999.

CHECK YOUR LIBRARY OR BOOKSTORES FOR OTHER BOOKS RELATING TO THE TOPIC.

Books in italics are especially suitable for Phase One - for preschool children.



SUN, MOON AND WORDS

BEGINNING SOUNDS

sun
summer
silver
side
solar
star
space
sleep
sky

day
down
dark
diamond
dazzling
darkness
dream

ball
bear
Big Dipper
bright
breakfast
breaking

fire
fall
full
far
flight
float

wonder
wind
winter
warm
world
weather

high
heavens
half
hot
hunter

ENDING SOUNDS

morning
evening
breaking
rising
falling
raining
snowing
dreaming
glistening
dazzling
twinkling
shining

bright
light
night
tonight
flight
dipper
hotter
colder
winter
summer
wonder
silver

LONG VOWEL SOUNDS

fire
side
shine
rise
time
wake
shape
space
place
dream
rain
float

SHORT VOWEL SOUNDS

sun
summer
up
under
hunter

wind
winter
travel
pattern

R-CONTROLLED VOWELS

star
warm
dark
far
morning

ANTONYMS

day – night
hot – cold
up – down
above – below
over – under
rise – fall
sleep – wake
summer – winter
dark – light
morning – evening

SYNONYMS

shining
twinkling
glistening
sparkling
dazzling

COMPOUND WORDS

sunlight
sunshine
sunbeam
sunrise
sunset
sundown
sunburn
sunscreen
sunflower
sunroof

starlight
stardust
starfish

moonlight
moonbeam

daytime
nighttime
skyland

OTHER WORDS

cloud
coyote
milky way
earth
galaxy
ray
pattern

moon
piece
constellation
travel
air
arrow
month

Word walls should be maintained. Instructors should ensure that students know the meanings of all of these words in this context and extend vocabulary by noting how they may mean other things in other contexts or they may have homophones. Experiences, pictures and student illustrations should be used to explain and process word meanings. Words that rhyme with these words can be examined to see varying spellings for sounds. Other words should be added. Teach the meaning of sayings such as “Once in a blue moon,” “Reach for the stars,” and “You are my sunshine.”

Science Standards and Benchmarks for Sun, Moon & Stars Unit

Standard – Understands that scientific inquiry works in particular wayss
Benchmarks
Understands that learning can come from careful observations
Understands that individuals can interpret the same thing in different ways

Standard – Understands essential ideas about the composition and structure of the universe and the motions of objects in it
Benchmarks
Knows that the stars are innumerable, unevenly dispersed and of unequal brightness
Recognizes that while the sun can be seen only in daytime, the moon is out sometimes at night and sometimes during the day
Recognizes that the sun, moon and stars appear to move across the sky every day (or night)
Knows that the face of the moon changes in a regular way, returning to the same shape after about a month

Standard – Knows basic concepts about the earth
Benchmarks
Knows that weather changes some from day to day, but things like temperature and rain (or snow) tend to be high, low or medium in the same months every year
Knows that water can be a liquid, like rain, or solid ice, and can be made to go back and forth from one form to the other, but the amount of water stays the same

Standard – Knows the form energy takes, its transformations from one form to another, and its relationship to matter

Benchmarks
Knows that the sun applies heat and light to earth

Standard – Knows the main features of the Copernican Revolution
Benchmarks
Knows that during the day, the sun seems to move across the sky; it rises and sets at slightly different times each day
Knows that at night, the moon moves across the sky, and the stars appear to form sort of a dome over the earth

Math Standards and Benchmarks for Sun, Moon and Stars Unit

Standard – Effectively uses a variety of strategies within the problem solving process
Benchmarks
Brainstorms possible things to do
Draws pictures to represent problems
Represents problem situations using physical objects
Clarifies problems using discussions with teacher or knowledgeable others

Standard – Understands and applies basic and advanced properties of numbers
Benchmarks
Has a general understanding of the concept of number
Uses counting to exemplify numbers

Standard – Uses basic and advanced procedures while performing computation
Benchmarks
Adds, subtracts, multiplies, divides whole numbers with accuracy
Adds, subtracts, multiplies, divides decimals with accuracy

Standard – Understands and applies basic and advanced methods of measurement
Benchmarks
Understands the basic characteristics of weight and how it is measured

Standard – Understands and applies basic and advanced concepts of data analysis and distributions
Benchmarks
Has a basic understanding of the concept of data

Language Arts Standards and Benchmarks for Sun, Moon & Stars Unit

Standard – Gathers information effectively through reading, listening and viewing
Benchmarks
Provides an accurate retelling of the main idea of simple expository information the student has read, heard or viewed
Understands that reading, viewing and listening are ways of gaining information about the world
Determines meaning of simple words from context
Creates mental representations for concrete information read, heard or viewed

Standard – Reads and responds to literature
Benchmarks
Understands that stories have beginning, middle and ending episodes
Understands the genre of legends and fables

Standard – Communicates ideas and information in writing
Benchmarks
Understands basic connections between spelling patterns and speech sounds
Understands basic phonological patterns in English
Expresses ideas in simple expository forms
Composes simple stories that express cohesive ideas

Standard – Understands and applies basic principles of language use
Benchmarks
Recognizes characteristic sounds and rhythms of language
Makes valid observations about the use of words

American Indian Content Standards for Sun, Moon & Stars Unit

Science

Science as Inquiry –
Indian students should develop an awareness that observations and understandings of ecological relationships traditionally formed an essential base of knowledge among American Indian cultures.

Earth and Space Science –
Indian students should develop an understanding of objects in the sky as exemplified by historical American Indian lunar calendars, traditional stories, and knowledge of weather patterns and constellations.

Indian students should develop an understanding of changes in the earth's surface, weather fluctuations and the movements of celestial objects and how they affected historical American Indian community locations, annual migrations, and agricultural and ceremonial cycles.

Language and Literacy

Indian students should be able to–
Listen for meaning and gain information from spoken English and a Native language.

Listen to Indian stories told in the oral tradition, comprehend their teachings and be able to retell them.

Speak coherently, conveying ideas in both English and a Native language.

Read fluently and independently, a variety of materials including those with American Indian themes.

Locate and use a variety of texts to gain information, for example, historical materials about their tribe, tribal legends and stories and oral history transcription.

Mathematics

Mathematics as Problem Solving –
Indian students should formulate problems from everyday and mathematical situations within their home and tribal/community worlds.

Mathematics as Communication –
Indian students should relate their everyday language to mathematical language and symbols including expressing mathematical concepts in their Native languages.

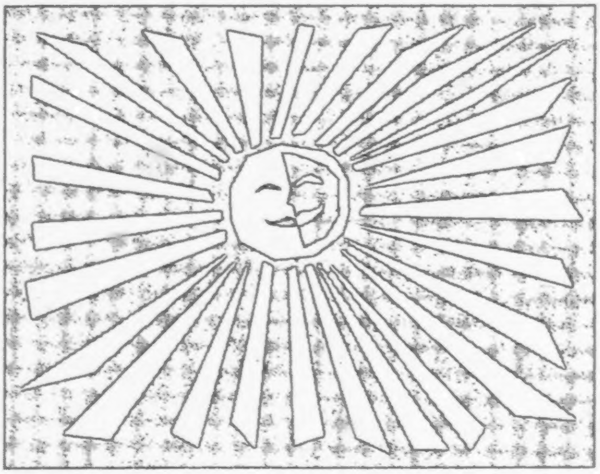
Estimation –
Indian students should explore estimation strategies through activities derived from their cultural worlds such as estimating the number of sheep/horses that fit in a pen/corral.

Fractions and Decimals –
Indian students should apply fractions and decimals by applying them to real world situations using Native cultural experiences.

Example Activities Developed by Teachers of American Indian Students

Workshop on Culturally-Based Math and Science Curriculum Development

Haskell Indian Nations University
1992



Ideas included should be adapted for appropriateness.

SCIENCE

Day and Night

Cultural Objective

Students will understand why it is important for Native Americans to understand their relationship with the world and the impact of nature on their lives today.

Math Objective

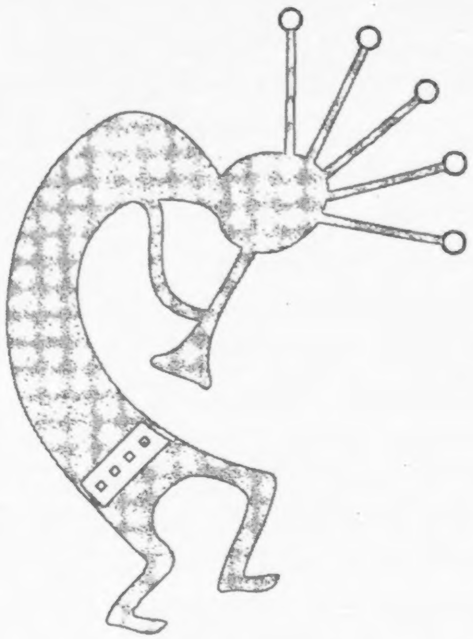
Students will be able to orally identify fractional parts (halves, thirds, fourths) of whole objects or sets of objects.

Science Objective

Students will understand the cycles of day and night including the sun, moon, and stars.

Teacher Background Information

Read the story of *The Way to Start a Day* by Byrd Baylor. This book tells how people worldwide greet the sunrise by the use of chants, flute music, songs, bells, and gifts.



Student Learning Activities

Science

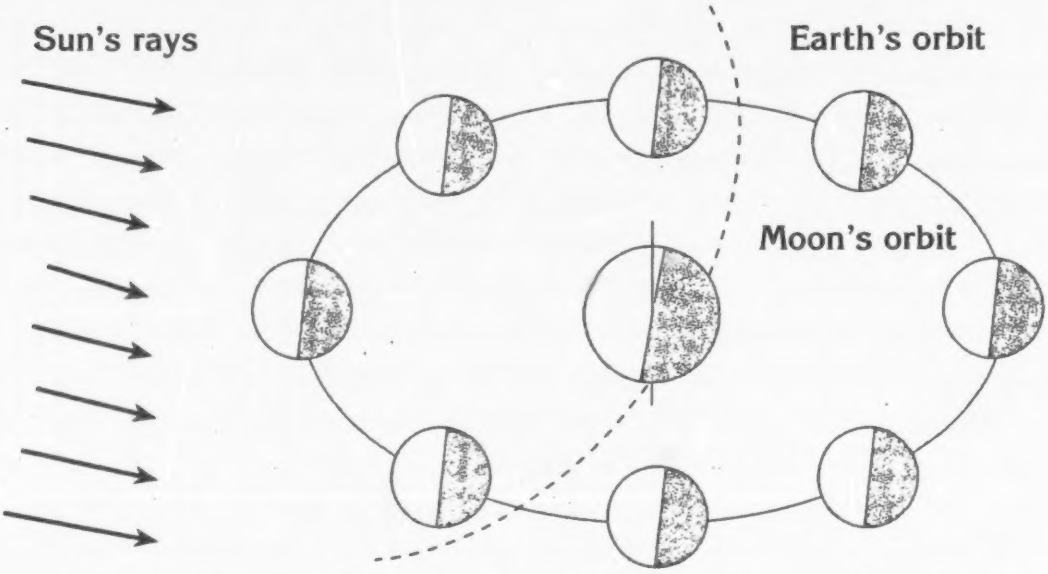
1. Have a class discussion about the sun and moon. Ask the following questions:
   a. What do we know about the moon and sun?
   b. When do we see it?
   c. Is it always the same?
   d. From where does the moon come?
   e. How does the sun warm us?

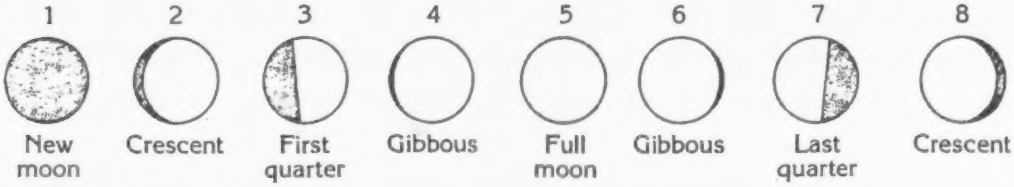
2. Demonstrate how the earth rotates to show day and night. Use a flashlight and a globe, or use students to show how the earth moves to give us day and night. Show why it makes days shorter and longer as in winter and summer.

Math

1. Match pairs of shapes of the suns and moons at different times ($^{1}/_{4}$ moon, $^{1}/_{2}$ moon, $^{3}/_{4}$ moon and full moon).

2. Identify the four basic fractions ($^{1}/_{4}$, $^{1}/_{2}$, $^{3}/_{4}$ & whole) using the moon. Using a picture, show how the moon starts as the month goes along. Show pictures of how it changes: $^{1}/_{4}$ of the moon is lit, then $^{1}/_{2}$, $^{3}/_{4}$ until the whole moon is full. The process can also be done in reverse.


Sun's rays
Earth's orbit
Moon's orbit


1
New moon
2
Crescent
3
First quarter
4
Gibbous
5
Full moon
6
Gibbous
7
Last quarter
8
Crescent

Evaluation

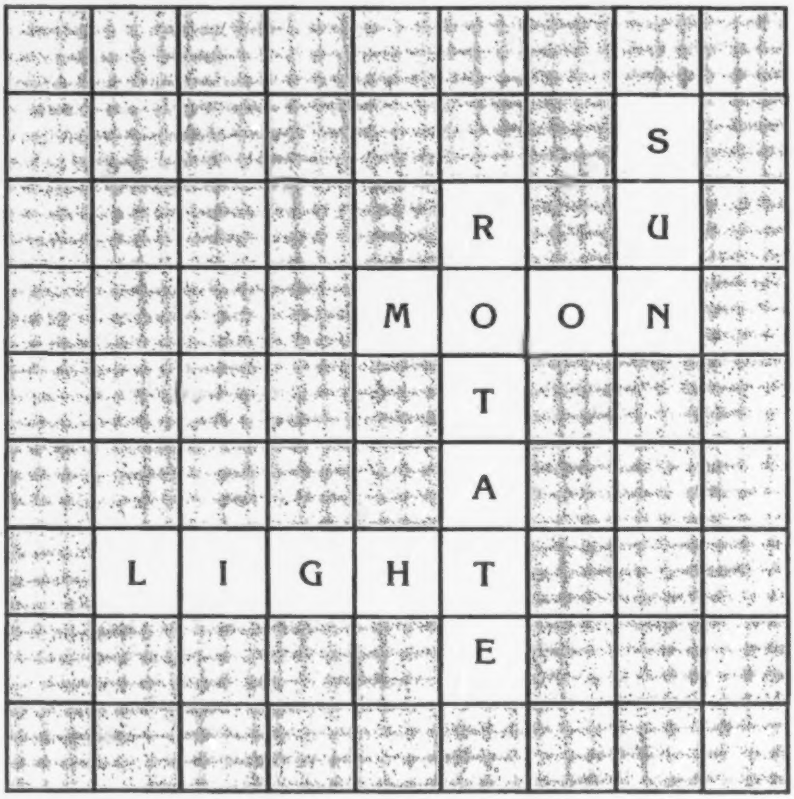
1. Have the class write a brief description of how they or their family greet the sun. Illustrate and color.
2. Using a flannel circle – have the class show the fraction for 1/4, 1/2, 3/4 and whole using a contrasting color of pre-cut flannel.
3. Have the class do a simple crossword puzzle answering the following questions:

   Across:

   1. Its shape seems to change.
   2. What do we get from both sun and moon?

   Down:

   3. It warms the air and ground.
   4. What does the earth do?



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Resources

Heil, David, *Science: Discover the Wonder, Grades K-2*, Glenview, Illinois, 1993.

Developed By

Arlene Valenzuela

MATH

Time to the Nearest Hour

Cultural Objective

Students will understand the Native American concept of time.

Math Objective

Students will relate to time to the nearest hour.

Teacher Background Information

Time is one of the world's mysteries and is viewed by different cultures in many different ways. Early Native Americans didn't measure time to the hour because they didn't need to know this information for planting and harvesting or for the breeding of animals.

Our Native American ancestors used the sun, moon and stars to help them tell time. They would tell how much of the day was left from the position of the sun and the length of the shadows.

Student Learning Activities

1. Make cards with digital times from 1:00-12:00 on them. Have a regular clock available. Let students draw a card and set their clock to the same digital time.
2. Draw a large clock on the floor. Use ribbons to represent the hour and minute hands. Have one student hold the minute ribbon and stand on the number 12. Explain that when the minute hand is on 12, the time says, "o'clock." Have another student hold the shorter ribbon, and walk to each number as the students count. Have the minute hand say, "o'clock." Relate this to the movement of the clock's hands.

3. Discuss the time of day. Have students indicate whether they think the following activities occur during the day or during the night: sun shining, eating dinner, going to school, eating breakfast, seeing the stars, needing artificial lights to see. Call on students to act out an activity and let the class guess what the activity is. Show the time on a clock.

4. Divide the students into small groups. Give each group a different time of the day. Have each student in the group draw a picture of what might happen at that time. Sequence the pictures from each group.

5. Give each student a clock with no numbers on it. Give the children the number cards with 1-12 on them. Have them put their cards on the proper place on the clock..

Evaluation

Direct the students to go through magazines and find pictures of daytime and nighttime activities. Label one half of a bulletin board "day" and one half "night." Write the digital times to the hour on index cards and place them in an envelope attached at the bottom of the board.

Attach a clock under the "day" and "night" headings on the bulletin board. Have the students select a card with the digital time on it. Moving the hands on the day or night clock face, have students select a picture of an activity. Attach it to the board under the "day" or "night" heading, according to what they consider appropriate. Then they can move the clock hands to estimate the time to the hour that they think the activity would take place.

Resources

Fennel, Francis "Skip", Reyes, Barbara J., Reyes, Robert E., and Webb, Arnold W. *Mathematics Unlimited.* New York: Holt, Rinehart, and Winston, 1987. pp. 89, 97-98, 107.

Developed By

Georgie Riley
Mary Stonehouse

MATH AND SCIENCE

Clocks and Calendars

Cultural Objective

Students will learn about some traditional Native American concepts of time and the seasons.

Math Objectives

The student will:

tell time to the minute

make simple picture, bar and line graphs.

Science Objectives

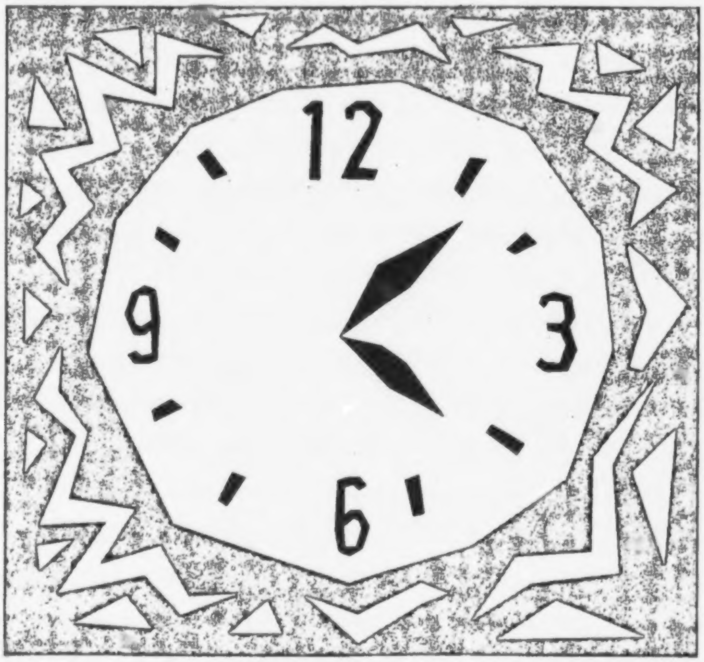
The student will:

use observation skills

use classification techniques

make simple predictions

analyze data.



Student Learning Activities

1. Discuss the story about spring and winter and describe what Old Man Winter looks like. Ask students why they think that the ground turned into stone when he stepped on it and why the two men did not sit in front of a real fire? Describe what Spring and Winter looked like in their human forms.

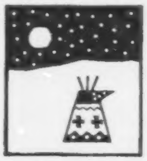
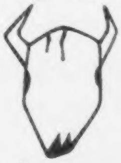
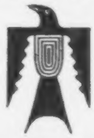
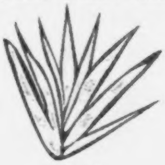
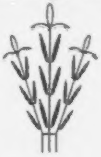
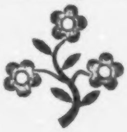
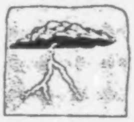
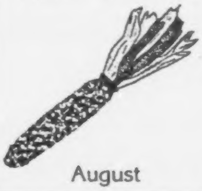
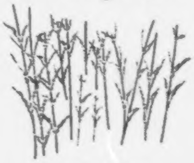
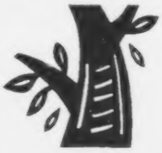
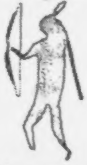
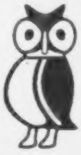
2. Make a chart for students to record the temperature twice daily (preferably early morning and afternoon). Record the difference in the temperatures.

3. Construct a clock on the bulletin board. Ask a variety of time questions on separate cards (i.e. show the time on the clock and ask for the numerical time or give the numerical time and ask for a picture of the clock face).

4. Provide sufficient celsius thermometers, containers of ice and containers of water so that students can work in small groups. Have students place thermometers in the water and record the temperature, then place the thermometers in the ice and record that temperature. Ask students to discuss the difference in degrees.

5. Show the students two annual calendars, the Julian and the Miamian. Compare and contrast the two calendars, then ask students to develop a seasonal division for each.

Miami Indian Calendar

Snow Moon  January	Hunger Moon  February	Bird Return Moon Crow Moon  March
Green Grass Moon  April	Planting Moon  May	Rose Moon/Flower Blooming Moon  June
Heat Moon/Lightening Moon  July	Green Corn Moon  August	Gathering Moon  September
Leaf Falling Moon  October	Hunting Moon  November	Long Night Moon  December

Evaluation

Ask students to perform the following activities:

1. Discuss and compute the difference in the morning and afternoon temperatures.
2. State and record the time to the nearest minute.
3. Identify the temperature at the boiling point and freezing point of water and be able to express the experiment.
4. Differentiate between the Miami Tribal calendar and the Julian calendar even though the names of the months and divisions of the seasons are the same.

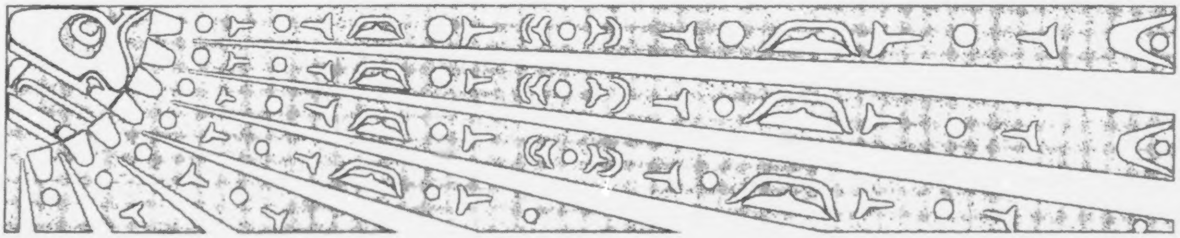
Resources

Caduto, Michael J. and Bruchac, Joseph. Spring Defeats Winter in *Keepers of the Earth: Native American Stories and Environmental Activities for Children.* Golden, Colorado: Fulcrum, 1989, pp. 129-130.

The American Indian Institute. *Legacy of the American Indian: Lessons For The Classroom.* Norman, Oklahoma, Continuing Education and Public Services.

Developed By

Marcella Ben Vaughn



MATH AND SCIENCE

The Fun Sun

Cultural Objective

Students will understand the importance of the sun's energy for life on earth and recognize the interconnectedness of the natural world with themselves.

Math Objectives

Students will:

recognize simple pattern in sequence

orally identify fractional parts (halves, thirds, fourths) of whole object or sets of objects

tell time to the hour and half-hour.

Science Objectives

Students will:

use observation techniques

communicate with basic scientific vocabulary

understand the cycles of day and night, including the sun, moon and stars.

Student Learning Activities

1. Students will listen to the story "How Grandmother Spider Stole the Sun" and discuss why the sun is important. Name gifts we get from the sun. Make a list of the gifts and post it up for students to see.

2. The class will observe the cause of the day and night cycles by using a flashlight and globe in a fairly darkened room. Put a dot on the globe to indicate the general area the students live. Use the flashlight for sunlight. Turn the lights off and have students take turn shining the flashlight on the globe. What part of the globe is light? What part of the globe is dark? What is the lighted part called? What is the dark part or shadow called? Next, turn the globe slowly. Students can do this one at a time. What is happening to the dot that represents our home town?

3. Discuss the shape of the sun, earth, moon and star from their view.

   Name things that are circles in the classroom.

   Using circle patterns, trace and cut out circles to represent sun, earth, moon and star. Order the cut out circles from largest to smallest. Unscramble the ordered circles and order circles from smallest to largest.

   Next, fold the circles in halves, then fold the circles in fourths.

   Using the circle patterns, cut more circles to illustrate a picture of the day and night cycle. Glue the shapes on paper provided. Cut out more star circles and glue them on.

   Divide the earth in half vertically and color it dark to represent the night. Write sun, earth, moon and star next to the right circle. (See illustration.)

4. Discuss what things they see during the day and what things they see at night. List them on the paper and post it up. Draw and write about what things they see during the day and night using the list.

5. Discuss time to the hour and half hour. Make a clock. Using the clock show when school starts, what time recess is, what time lunch starts and ends, and when school is out. How many hours are in a day? What time do you get up and go to bed? Questions can vary.

6. Demonstrate that different colors absorb different amounts of solar heat.

Divide students into small groups. Place newspapers, paintbrushes, containers of water, and paper towels on desk tops. Give each group five empty aluminum cans. Using tempera paints or acrylics (black, white and choose three other colors) paint each can. Let the cans dry. After the cans are dry, fill each can with tap water. Measure the water temperature. Record the information at each group. Place the colored cans filled with water outside in a sunny place. Measure the water temperature every 15 minutes for 30 minutes or one hour. Record the information at each group.

Questions and Explanations

Compare the water temperatures.

Did the water temperature rise or not?

The higher the temperature the more heat it absorbs.

The lower the temperature the less heat it absorbs.

What color(s) had the hottest temperature?

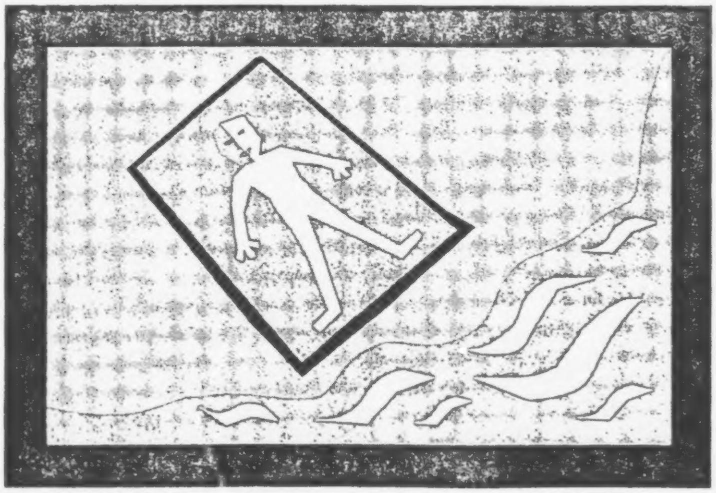
What color(s) had the lowest temperature?

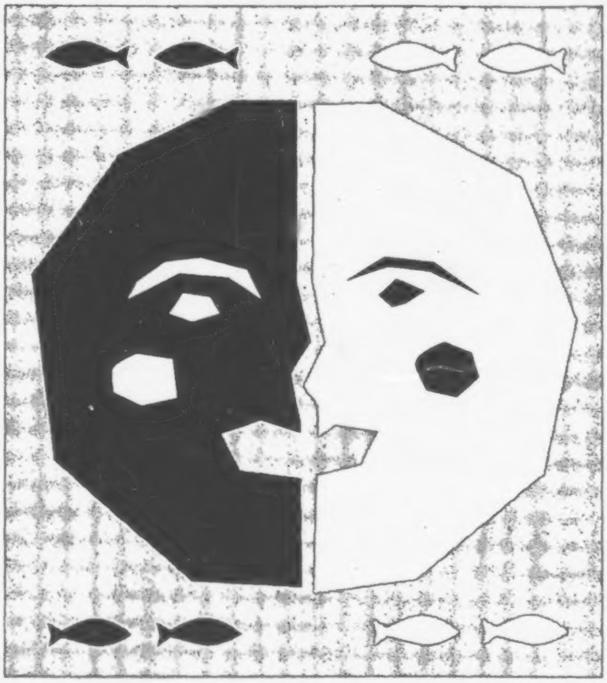
Relate this activity to wearing colored clothes.

Does a black t-shirt absorb more or less heat?

Does a white t-shirt absorb more or less heat?

Does a colored t-shirt absorb more or less than black or white?





Evaluation

1. Discussion on the importance of the sun and its gifts.
2. Cut out circles and fold into fractional parts (halves and fourths).
3. Illustrate day and night cycles.
4. Make clock and tell time to the hour and half-hour.
5. Write about things they see during the day and at night.
6. Demonstration of solar heat.

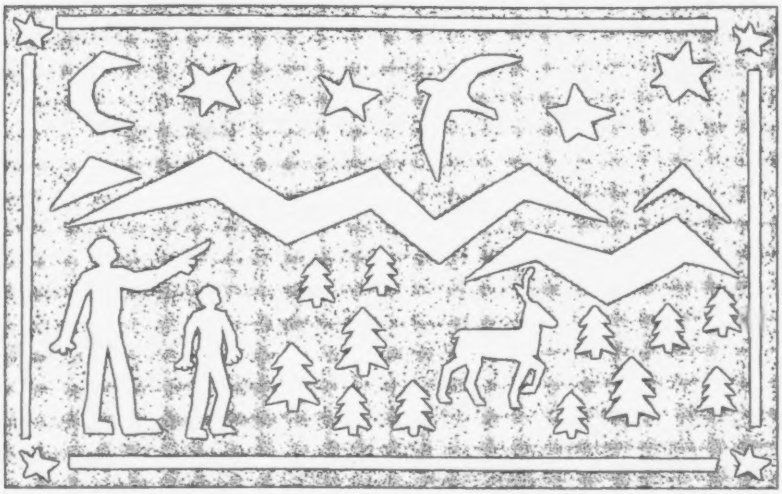
Resources

American Indian Science and Engineering Society. *Hands On/Minds On: Science Activities for Children.* Boulder, Colorado: 1992, p. 5.

Caduto, Michael J. and Bruchac, Joseph, *Keepers of the Earth: Native American Stories and Environment Activities for Children.* Golden, Colorado: Fulcrum, 1989, pp. 49-50.

Developed By

Mae Mallahan



SCIENCE

Sunrise, Sunset

Cultural Objective

Students will understand and relate the importance of the sun as it pertains to their culture.

Science Objective

Students will:

identify the importance of the sun

identify uses and forms of the sun's energy

communicate using basic scientific vocabulary.

Teacher Background Information

Arrow to the Sun is a good introduction to the important role of the sun to Native people. This is a story about a young boy sent to Earth by the Sun. Because of this, he was teased and rejected by the other boys. He wanted to find his father. He began his journey and in doing so became an arrow, which is how he traveled to the Sun. There, he has to prove himself by going through a test. He returned to his people and they celebrated his return with the Dance of Life.

Student Learning Activities

1. Have the class write and discuss the following questions:
    a. What is the sun?
    b. Of what is it made?
    c. As a safety precaution – Why don't we look directly at it?
2. Demonstrate how the sun is stationary and the earth moves in the sky. Substitute a flashlight for the sun and a student as the earth. Rotate the child to demonstrate day and night. Use the flashlight to show how light travels in a straight line from the sun to earth.
3. Discuss what the sun gives us – heat, light, energy. Use terminology: gases, sunlight, energy, sundial and rotate.
4. Create a sundial using pencil, tape and recording sheet.

Evaluation

Play the game "Sunny Vocabulary Bingo." Caller reads questions aloud and students cover the answers if given on his bingo card. (See example given.)

1. Gas storms on the sun's surface.
2. Exposing the body to sunlight for an extended period of time.
3. When the sun goes down.
4. When the sun comes up.
5. Large plants with yellow petals.
6. The oldest device used to measure time.
7. Florida.
8. A medical condition when the body becomes overheated because of overexposure to sun.
9. Swims in the freshwater lakes and rivers of North America.
10. Inflamed skin caused by overexposure to sun.

Answers

1. sunspots
2. sun bath
3. sunset
4. sunrise
5. sunflowers
6. sundial
7. Sunshine State
8. sunstroke
9. sunfish
10. sunburn

Resources

McDermott, Gerald. *Arrow to the Sun: Pueblo Indian Tale.* New York, New York: Viking Press, 1974.

Developed By

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SCIENCE

Solar System

Cultural Objective

Students will relate the stories and beliefs of the sun, moon and stars to their tribal life.

Science Objective

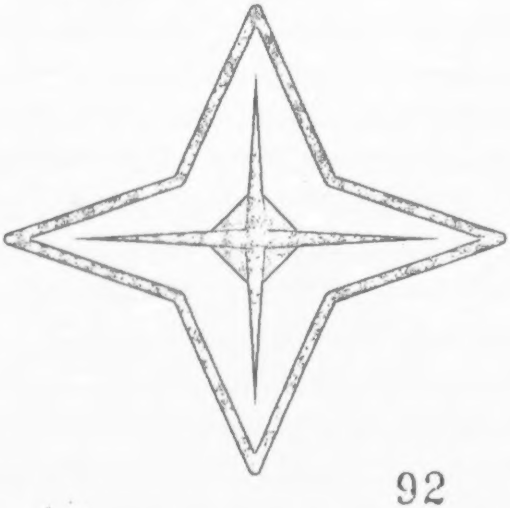
Students will recognize the size and shape of the sun and moon in relationship to the earth and each other.

Teacher Background Information

"How the Sun Made a Promise and Kept It," by Margery Bernstein and Janet Kobrin, relates the myth of the creator, Weese-ke-jak, who didn't like the sun coming and going whenever he wanted. One day he made a net to capture the sun. The sun then made the earth so hot that the birds and the animals could not live in their natural environments.

Weese-ke-jak then made the sun promise to stay close enough to the earth to keep it warm. The problem was that the sun was so hot that none of the animals except the Beaver would try to release the sun. He gnawed with his small front teeth until he set the sun free. All of the animals thanked Beaver for his bravery. Weese-ke-jak gave Beaver two gifts: two large front teeth and a smooth, shiny coat. He kept his tail bare to remind everyone how brave Beaver was in setting the sun free.

The sun was always free from the earth, but not from Weese-ke-jak's net. From that time on, the sun has kept his promise.



Student Learning Activities

1. Read the story about the sun keeping his promise, discuss it, and draw a picture of the sun caught in the net of Weese-ke-jak. Continue with the Navajo sticks example of the sun and the moon. The sun and the moon are never separated. The sun stick is called the "abalone which shines out of an abalone basket." The moon is a "perfect white shell bowl which shines out of a white shell basket." Both sticks are deposited on a "high hill towards the East."

2. Show a picture of a daytime scene and ask the students why they like the daytime. Emphasize that the sun lights up the land and the sky all day. Then show a nighttime scene with a moon shining on the ocean or some other reflective surface. Ask the students what they see and emphasize that the moon lights some things at night, but it is mostly dark because the sun is on the other side of the earth.

3. Make cutouts of the sun, moon and stars large enough to attach yarn or cord. Have the children sing songs appropriate to the shape they wear: "Twinkle, Twinkle, Little Star," "You Are My Sunshine," and "Hey Diddle, Diddle...the Cow Jumped Over the Moon." Students may do this for their own enjoyment, as an introduction to the Solar System unit, or as a presentation to another class or parents.

4. Relate the basic facts about the solar system (listed below) to other activities listed in this unit:

   There are nine planets.

   The four planets closest to the sun are rocky because they are made of solid material.

   The next two are giant planets. They are very large and in many ways are like the sun.

   The last three are icy planets: temperatures vary, but they are still cold.

   The size of the earth compared to that of the sun is like a grain of sand against a basketball. With these sizes, the distance between them is 3.5 meters.

5. Illustrate the scale of the solar system with the following materials:

9 strips of oak tag 2 cm x 4 cm
Different-sized buttons and juice, soup, and soft drink cans
Different-colored paper (not black)
Meter or yard stick
Black marking pen
Masking tape
Ball of heavy string
Long hallway or auditorium
Yellow circle (30 cm in diameter)

Procedure:

Tape the yellow circle to one end of the ball and label it "Sun." Use different-sized buttons as patterns to draw circles on colored paper to represent smaller planets: Mercury, Venus, Earth, Mars and Pluto. Use cans of different sizes as patterns for Jupiter, Saturn, Uranus and Neptune. (Remember that Jupiter and Saturn are much larger than the other planets.) Write the name of the planet on each of the nine strips of oak tag. Tape the planet and its name in order, starting from the Sun, along the wall of the hall of your school. Use the meter stick to measure the following distances from the Sun:

a.	Mercury	39 cm
b.	Venus	72 cm
c.	Earth	1.00 m
d.	Mars	1.52 m
e.	Jupiter	5.20 m
f.	Saturn	9.52 m
g.	Uranus	19.60 m
h.	Neptune	29.99 m
i.	Pluto	36.37 m

6. Buy a precut model of the Solar System. Punch out and construct a mobile, using a dowel rod with the Sun and Planets hung on fish line.

7. Cut out pictures of the Solar System and place them on a bulletin board against a dark blue background.

Evaluation

Students will construct a bulletin board or mural representing activities on the sun, moon and stars unit. They will describe the solar system which they created.

Materials needed: stencils, large cutouts, pictures, glue, markers, construction paper (yellow, white) and scissors.

Time: 2 hours

Resources

Kennedy, Paul E.. *Fun with Sun, Star and Moon Stencils.* New York, New York: Dover Publications, Inc., 1991.

Bernstein, Margery and Kobrin, Janet. *How the Sun Made a Promise and Kept It.* New York: Charles E. Scribner's Sons, 1977.

Discover The Wonder (Level K). Chicago, Illinois: Scott Foresman Science, Scott Foresman, IL, 1993.

Tolman, Marvin N. and Morton, James O.. *Earth Science Activities for Grades 2-8, Vol. III.* West Nyack, New York: Parker Publishing Company, Inc., 1988.

Wyman, Leland C., *The Mountainway of the Navajo.* Tucson, Arizona: University of Arizona Press, 1975.

Developed By

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Vera Freeman
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John Wray

MATH AND SCIENCE

Seasons

Cultural Objective

Students will understand how Native American people view nature and the cycles of a season.

Math Objectives

Students will:

- make and interpret pictorial illustrations and charts
- record weather changes
- interpret calendars.

Science Objective

Students will become familiar with the fundamental concepts of atmosphere, climate and weather.

Teacher Background Information

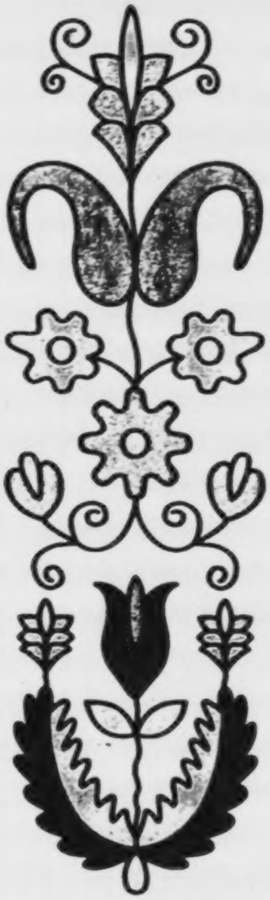
From earliest times, people have found ways to mark the passage of time. For example, some Native Americans used bundles of sticks to record the passage of months. For each day that passed, one stick was removed from a bundle.

The Chippewa studied the heavens and could tell the time of night and the season of the year by observing the constellations. The seasons of the year form a great circle as they change, and the circle is continually repeated. There is no beginning and no ending.

We live our lives according to the seasons. The following story about the life cycle of a plant further illustrates this point.

Seasons

Pretend that you are a seed resting in the soil. Winter is moving north and the soil around you feels warm and wet. Slowly you begin to unfold. Your root goes down into the soil, and your sprout pushes upward. In a few days your leaves begin to unfold and they poke up out of the dark soil into the bright, warm sun. You grow taller and taller. You can feel your leaves stretch wider and higher toward the sun.



As spring turns into summer, a bud forms on your head and finally opens into a beautiful flower. Feel the long, hot days of summer and imagine rain upon your leaves and petals. Some mornings you feel cold dew on your leaves. One day a bee buzzes over and leaves pollen from another flower to help your seeds grow.

The days grow short during the fall and one morning you feel cold and find that frost has frozen your leaves. You are all shriveled up, but now you have seeds on you where you had none before. One day a cold, hard wind blows and your seeds shake loose, falling to the ground. There is not much left of you now and the days are very short. You are a dried-up brown stalk when the first snow comes, but near your roots, resting in the ground, are the seeds which will become new plants.

In the springtime, the sunshine and rains will start the cycle all over again.

Adapted from Michael Caduto and Joseph Bruchac. *Keepers of the Earth.* Golden, Colorado: Fulcrum, 1989.

Student Activities

1. Place a picture of clothing for different kinds of weather in a large manila envelope on the bulletin board. Have children draw symbols for different kinds of weather in a smaller envelope. Each day, children can pick appropriate items of clothing from the envelopes and attach them to the bulletin board.

2. Help the students to make a large paper calendar for the current month and place it on the floor. Divide the class into teams, and, using a beanbag or other marker, toss the markers onto the calendar. Children should name the numbers on which the markers land. Students earn points for each number named correctly.

3. Help the students construct a calendar for the school year and tally daily weather.

4. Celebrate the 40th Day of School. Graph or mark each day of school from the beginning of the school year with one of the following, tied in groups of ten:

    a. multicolored straws

    b. large plastic clips

    Celebrate the end of each week with counting activities to 40. Count raisins, small candies or popcorn and then eat them.

5. Count in the students' native languages, clapping the appropriate number of times for each number counted.

6. Make a large circle and divide it into four equal parts. In each part write the name of a season and illustrate as desired, for example, with pictures of children dressed in clothing appropriate for the season and participating in seasonal activities. Other possibilities include pictures of trees in different seasons or the life cycle of corn, berries or pumpkin.

Evaluation

1. Have the children draw pictures of the life cycle of a plant.
2. Have the children play the life cycle of a plant, using the characters and creative costumes listed below and the following materials: dried beans or peas for seeds, white shredded paper for snow, small container with yellow corn meal to be used for pollen, and a paintbrush for the bee to use in spreading his pollen.

Sun with large yellow paper circle and protruding rays
Bumblebee with yellow paper wings
Rain with large white cloud
Wind with long flowing crepe paper streamers
Flowers
Storyteller

Resources

Michael Caduto and Joseph Bruchac. *Keepers of the Earth.* Golden, Colorado: Fulcrum, 1989.

Numbers. Cypress, California: Creative Teaching Press, 1990.

Developed By

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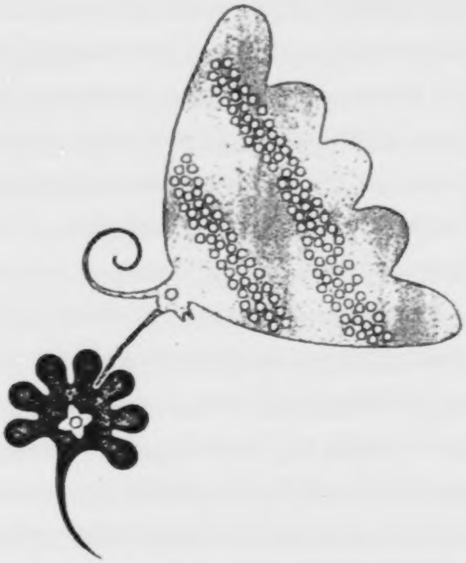
Becky YoungBear



MATH AND SCIENCE

The Wonder of Weather

Cultural Objective

Students will discover the spiritual and artistic significance of the elements that make up weather and their importance to Native Americans.

Math Objectives

Students will:

- identify and collect data
- make comparisons and predictions about pictures and bar graphs
- use a calendar to find answers to a simple problem
- fill in missing numbers in addition and subtraction expressions in both vertical and horizontal problems

Science Objectives

Students will:

- use observation techniques
- use classification techniques
- utilize prediction techniques
- gather information
- describe the elements that make up weather

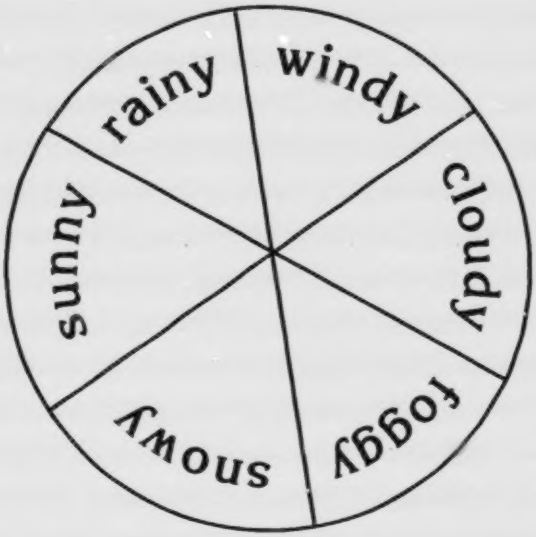
Teacher Background Information

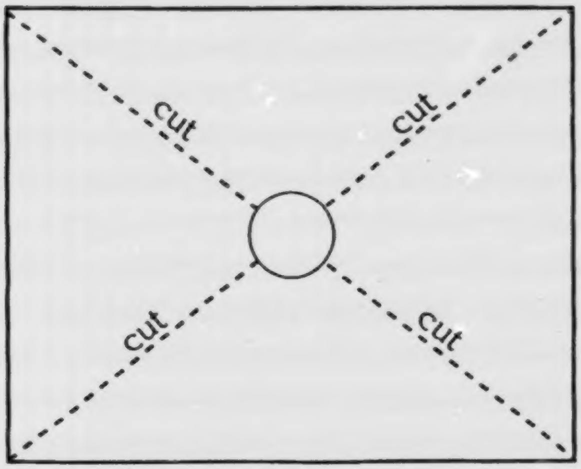
The legend of "Spring Defeats Winter," retold in *Keepers of the Earth* by Michael J. Caduto and Joseph Bruchac, takes place when the world was new. Old man winter sat in his lodge with his only friend, the north wind. One morning when they awoke, they noticed something different; the weather had begun to change. North wind fled to where the snow and ice were deeper, but the old man remained alone in his lodge until a young man forced his way into the lodge. The young man began to make the lodge very warm, which caused the old man to sweat and become angry.

The young man told the old man that he had brought the south wind and sunshine with him. "You need to leave," he told the old man, who felt himself becoming smaller and smaller.

Sample A

Weather Wheel Pattern





Sample B

Pinwheel Pattern

Student Learning Activities

1. Discuss the weather with questions such as:

   What did the weather have to do with the clothes you are wearing today?

   What is weather?

   What happens to a slide on a sunny day?

2. Create a bulletin board display which shows how people dress in different types of weather.

3. Create a bulletin board display called TODAY'S WEATHER by having students observe and illustrate the day's weather.

4. Create a weather wheel showing different types of weather (see Sample A).

5. Discuss the question of why air becomes warm:

   Place a piece of black construction paper in a sunny spot and another piece in a shady spot. After 15 minutes, have the students place their hands above the paper. The paper placed in the sunny spot will have warmed the air above it and the sun will have warmed the paper.

6. Make pinwheels (see Sample B), take them outside and watch them turn in the wind.

7. Discuss the ways in which we predict the weather.

8. Have the students illustrate the clouds they see.

9. Ask the students to predict the weather based upon their observations of the clouds.

10. Create a weather calendar (monthly or weekly) using the information from the TODAY'S WEATHER bulletin board.

11. Have the students make a bar graph showing the number of days that are sunny, cloudy, foggy, rainy, windy and snowy in their local area.

12. Have students answer questions from the graph, such as "How many more days are sunny than rainy?"

13. Have the students complete cloud wheels (see Sample C on the following page) by adding or subtracting degrees of temperature.

Evaluation

1. Ask students to write about their favorite kind of weather.
2. Have students illustrate their writing.
3. Ask students to answer these riddles about the thermometer:

Subtract 8 from me. You will have 8. What am I? (16)
Subtract 8 from me. You will have 7. What am I? (15)
Subtract 9 from me. You will have 3. What am I? (12)
Subtract 6 from me. You will have 5. What am I? (11)

Resources

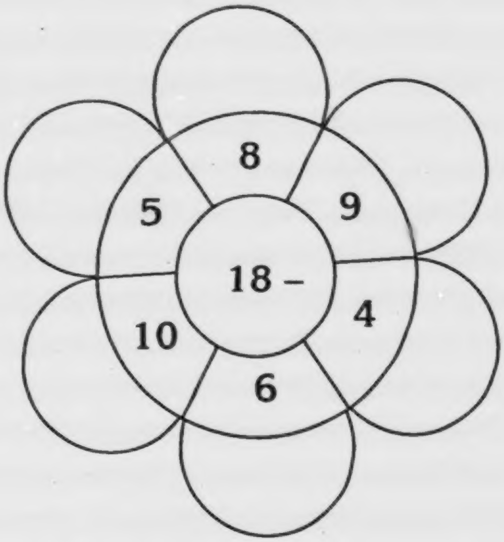
Science Horizons. Teacher Edition 2. Morristown, New Jersey: Silver Burdett and Ginn, 1988.

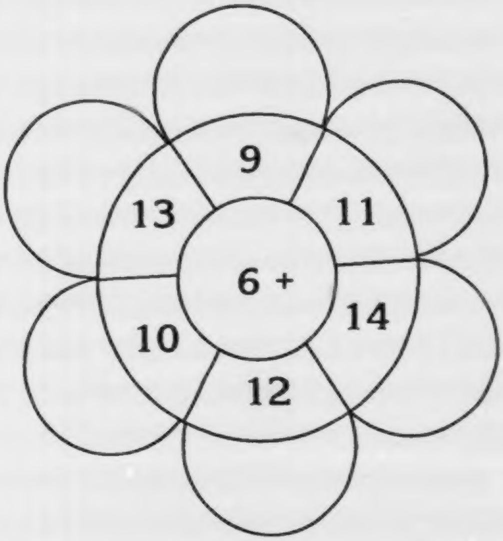
Michael Caduto and Joseph Bruchac. *Keepers of the Earth: Native American Stories and Environmental Activities for Children.* Golden, Colorado: Fulcrum, 1989.

Developed By

Bonnie McGinnis

Sample C
Cloud Wheels





My Ideas for Sun, Moon and Stars Unit:

Lesson Plans/Schedule for Sun, Moon and Stars Unit

Nursery Rhymes and Poems

Starlight
Starlight,
Starbright,
First star
I see tonight.
I wish I may,
I wish I might,
Have the wish
I wish tonight.

Rock-a-bye, baby on the tree top
When the wind blows the cradle will rock,
When the bough breaks the cradle will fall,
And down will come baby, cradle and all.

Sleep, baby sleep
The father watches the sheep;
The mother is shaking the dream-land tree,
And down falls a little dream on thee:
Sleep, baby sleep

Sleep, baby, sleep
The large stars are the sheep,
The wee stars are the lambs, I guess,
The fair moon is the shepherdess:
Sleep, baby sleep

Twinkle, twinkle, little star
How I wonder what you are
Up above the world so high
Like a diamond in the sky
Twinkle, twinkle, little star
How I wonder what you are

Hey diddle diddle,
The cat and the fiddle,
The cow jumped over the moon.
The little dog laughed
To see such sport
And the dish ran away with the spoon

A dillar, a dollar
A ten o'clock scholar
What makes you come so soon?
You used to come at ten o'clock,
But now you come at noon.

Star Song
We are the singing stars,
We sing with our light,
We are the birds of fire,
Through the heavens we take our flight.

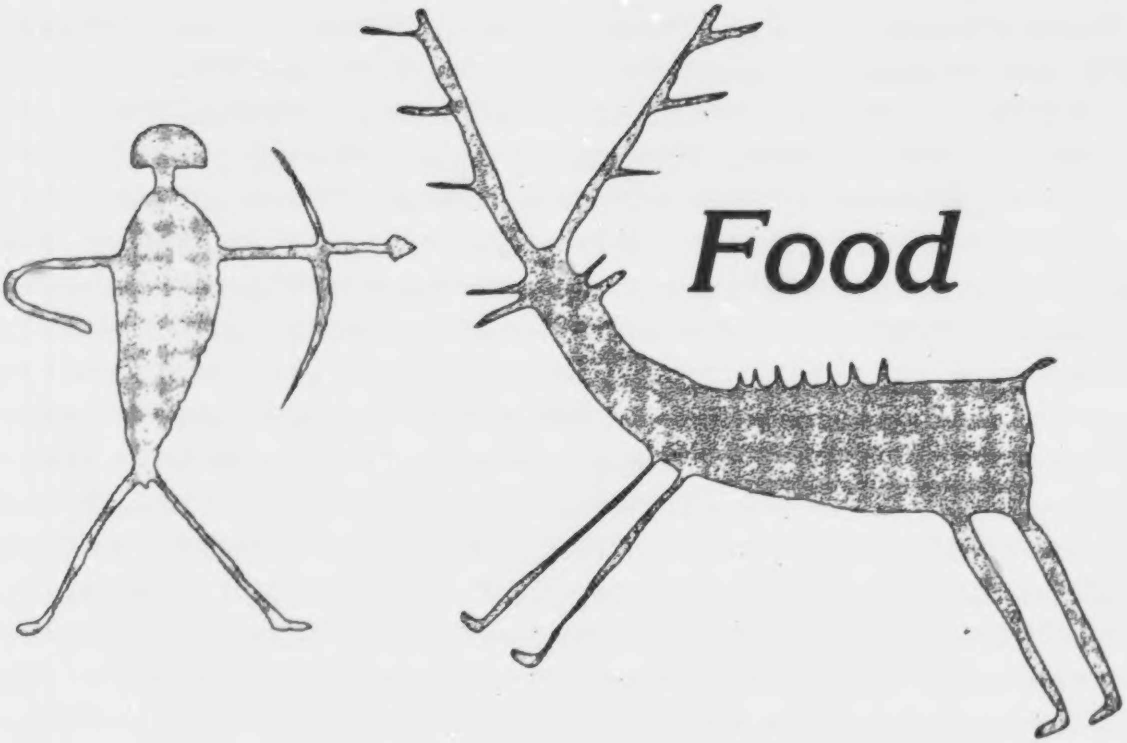
Our light is as a star,
Making a road for spirits.

Among us are three hunters
Forever chasing a bear.
There never was a time
When they were not hunting.

We look down upon the mountains.
– Passamaquoddy Indian song

The teacher should have the students do choral readings of these selections, memorize and recite them, and explain what they mean in their own words. These can be used to stress phonemic awareness and beginning sounds/ending sounds, rhyming words in kindergarten and other word-attack principles such as the ing and le sounds, long and short vowel sounds, sight words, r-controlled vowels, etc. at the other grades.

Food



Background Information for Teachers and Parents

Phases 2 and 3

Indian Food

In North America, native people have cultivated over 2,000 species of plants for food. At least 19 of these plants had to be cultivated, such as corn, beans, squash, tomatoes, avocados and peppers. Horticultural techniques are credited by scientists to have been more advanced in the Americas than they were in Europe. For example, 250 different kinds of potatoes were planted by Inca farmers; only one of which, the "super potato," was used in Ireland.

Indian people learned that by planting beans and corn (and sometimes, squash) together, the crops would be larger and healthier. This is due to the fact that the nitrogen, needed by corn, was generated by the beans' roots. Corn, beans and squash are sometimes referred to as the "three sisters." The use of fish as fertilizer by burying it in the soil also brought about improvement in crop yield. When Indian people rotated crops, they found that they could improve the quality and/or size of plants.

Some foods required special preparation. Acorns were boiled or roasted and the oil extracted for cooking. Acorns and certain roots were made edible by boiling them in lye-water made from the ashes of a hardwood tree such as ash or oak. Acorns and roots could then be soaked in fresh water to remove the lye and added to stews or pounded into meal for bread.

In addition wild plants such as burdock, dandelion, milkweed, mushrooms, berries, wild rice and nuts were also used for food.

In fact, the same plant could be used for many different purposes. In the corn plant, tubes from the stalk were used for medicine; husks for kindling and as tapers for carrying fire; husks for weaving mats, baskets and moccasins; corn silk for medicine; corn cobs for smoking hides; dried corn kernels for beads and decoration; green corn leaves for bandages; and, of course, corn is a very nutritious "high yield" food.

from *Science and Cultural Curricula*, Indian Education Act Resource and Evaluation Center One, ORBIS Associates, Washington, DC, 1986.

These are things your children should know.

Background Information for Teachers and Parents

Phases 4 and 5

Food and Cookery

– Bureau of Indian Affairs

Many of the most widely used and important foods known in the United States today are of American Indian origin. They are sold in supermarkets, enjoyed every day, and often prepared in the original way. Such classic American dishes as barbecue, steamed lobster, succotash, spoon bread, cranberry sauce and mincemeat pie are inherited from the first Americans. Until the white man came to America, the rest of the world knew nothing of such foods as avocados, sweet or Irish potatoes, pineapples, tomatoes, peppers, pumpkins or squashes, maple sugar and, of course, corn. Without corn, which most Indians regarded as a gift to be treasured and surrounded with ceremony, the colonization of America might have faltered. The wild rice of the Great Lakes region, which is now considered a gourmet delicacy, is still harvested by the Chippewa (Ojibwa). To a considerable extent, religious customs and beliefs determined what foods were eaten and how they were prepared.

Most Indians preferred cooked food to raw, and they had many methods of cooking and seasoning their food. Among the methods used were stoneboiling (putting hot stones into a basket or pot of water), drying, freezing and smoking. The various cooking methods obviously affected pottery and basketry types. Flavoring was accomplished by the use of seeds, roots, flowers and grasses. The north Pacific tribes used the tender inner bark of hemlock and spruce. In the southwest, mesquite beans, cactus and yucca fruits, and the agave were important.

Five distinct areas provide the Indian foods and recipes we use today. In the southwest, the Pueblo tribes, the Tohono O'odham (Bean People), and the Hopis grew peppers and beans which were made into savory chili, soups, guacamole and barbecue sauces. Along the northwest coast, seafood was the staple, and here women of the Tlingit, Kawkiutl, Salish and other tribes steamed and broiled salmon and dozens of other fish and seafood from the Pacific and the western rivers. On the vast plains, nomadic tribes such as the Sioux and Cheyenne roasted buffalo over campfires. In the South, Cherokees and other tribes had long enjoyed an impressive list of fragrant soups and rich stews, and they baked the same assortment of corn breads known today. Two particular American favorites, the clambake and Boston baked beans, were also staple favorites of the Narragansetts, Penobscots and Powhatans, who, like the Iroquois and other timber people of the east, steamed their dinners in earthen pits. Their method, still in use today, is now called "fireless cooking."

From all these regions, American Indians have bequeathed varied, imaginative and indispensable dishes. American Indian cuisine may rightly be considered continental cooking, indigenous and uniquely North American.

Suggested Primary Level Unit Outline – Food

Reading, Language Arts, Science, Math, Art, Values	Literature – Week 1	Literature – Week 2
P Food Words H Summarizing/Reporting A Reading Fiction S Retelling/Responding E Farming/Water Indian Farming Practices F Seed to Plant/Measure I Indians as Scientists V Drawing Food Still Life E Work to Help Others Wisdom/Generosity	*If It Weren't for Farmers* by Allan Fowler *Harvest Year* by Cris Peterson *How a Plant Grows* by Bobbie Kalman Hungry Mungry by Shel Silverstein *Jam: A True Story* by Margaret Mahy	*Four Seasons of Corn: A Winnebago Tradition* We Are Still Here Series *Heetanka's Harvest* by Jennifer Jones *The Sacred Harvest: Wild Rice Gathering* We Are Still Here Series
P Food Words H Retelling/The Oral Tradition A Performing Legends S Reading Nonfiction E Summarizing/Reporting Plant Needs-Our Needs F Nutrition O Foods I Like and Why U Food Group Charts R Make Sunflowers Caring for Ourselves/Others	*Sunflower's Promise* by Gloria Dominic *First Woman and the Strawberry* by Gloria Dominic *How Food Was Given* by Jeanette Armstrong Me Stew – Shel Silverstein	*Good Enough to Eat: A Kid's Guide* by Lizzy Rockwell *What We Eat* by Sara Lynn and Diane James *Sack Lunch* by Bob Reese *Mary Jo's Grandmother* by Janice Udry
P Food Words H Responding/Retelling A Reading Legends S Retelling/Responding E Performing Legends Reading Poetry T Memorizing/Reciting H Nutrition R List Foods I Like E Food Rhyme Posters E Liking/Disliking	*What Food Is This?* by Rosemarie Hausherr *Something Queer in the Cafeteria* by Elizabeth Levy *I Scream, You Scream: A Feast of Food Rhymes* by Lillian Morrison Recipe for a Hippopotamus Sandwich by Shel Silverstein	Waynabozho and the Wild Rice in *Keepers of Life* by Caduto and Bruchac *Iktomi and the Berries* by Paul Goble *Maple Moon* by Connie B. Crook
P Food Words H Reading Food Stories A Retelling/Responding S Being Hungry/Needs E Breakfast/Lunch/Dinner/Supper List Foods I Like Wondering/Observing T Nutrition W Making Food Collage O Using Manners	*My Whole Food ABC's* by David Richard *Who Ate It?* by Taro Gomi *Lunch* by Denise Fleming With His Mouth Full of Food by Shel Silverstein	*The First Strawberries* by Joseph Bruchac *Real Wild Rice* by David Martinson *Shemay, the Bird in the Sugarbush* by David Martinson

Literature – Week 3	Literature – Week 4	Reading, Language Arts, Science, Math, Art, Values
Ininatig's Gift of Sugar We Are Still Here Series Manabozho and the Maple Trees in *Keepers of the Earth* by Caduto and Bruchac *Circle of Thanks: Native American Poems of Thanksgiving* by Joseph Bruchac	*The Food Pyramid* by Joan Kalbacken *Food and Your Health* byJillian Powell *Nutrition: What's in the Food We Eat?* by Dorothy H. Patent Sarah Cynthia Stout Would Not Take the Garbage Out by Shel Silverstein	Food Words Summarizing/Reporting Foods Indians Contributed Reading Poetry Memorizing/Reciting Nutrition/Measure Height Science in Cooking/Measures Making/Eating Indian Foods Tree Parts/Functions/Bruchac Making/Illustrating Poem Posters Being Thankful for Gifts
American Indian Food by Jay Miller *Squanto's Journey: The Story of the First Thanksgiving* by Joseph Bruchac The Corn Spirit in *Keepers of Life* by Caduto and Bruchac The Garden by Shel Silverstein	*Experiment with Plants* by Monica Byles *Corn* by Elaine Landau *From Seed to Plant* by Gail Gibbons *Corn – On and Off the Cob* by Allan Fowler	Food Words Summarizing/Reporting Foods Indians Contributed Reading Historical Fiction Responding/Retelling Seed to Plant/Measure Uses of Corn Making/Eating Indian Foods Science in Cooking/Measures Making Corn Husk Dolls Being Thankful for Gifts
Nickommoh: A Thanksgiving Celebration by Jackie Koller *Corn Is Maize* by Aliki The Thanks to Trees in *Keepers of Life* by Caduto and Bruchac I Must Remember by Shel Silverstein	*Racoons and Ripe Corn* by Jim Arnosky *All About Seeds* by Susan Kuchalla *One Bean* by Anne Rockwell *Starting Science: Food* by Kay Davis	Food Words Summarizing/Reporting Foods Indians Contributed Seed to Plant/Measure Making/Eating Indian Foods Science in Cooking/Measures Tree of Attunemant/Bruchac Mothers/Grandmothers Visit Round Dance/Bruchac Make Turkeys Being Thankful for Gifts
The Popcorn Book by Tomie De Paola *The Maple Thanksgiving* by Joseph Bruchac *The Indians Knew* by Tillie Pine	*Food* Golden Books *Food* by Jan Pienkowski *Edward Plants a Garden* by Dale Gottlieb *Goodnight Moon* by M.W. Brown Melinda by Shel Silverstein	Food Words Summarizing/Reporting Foods Indians Contributed Seed to Plant Making/Eating Indian Foods Measuring/Timing Making Hand Turkeys Being Thankful for Gifts

About the Literature for Phase Five

Indian people contributed many of the foods we eat today. Many Indian tribes were excellent farmers long ago before the white man came.

Farming and Harvesting

If It Weren't for Farmers by Allan Fowler, Children's Press, 1992.
How a Plant Grows by Bobbie Kalman, Crabtree, 1996.
Harvest Year by Cris Peterson, Boyds Mill Press, 1996.
Jam: A True Story by Margaret Mahy, Little, Brown, 1985. **Included in some basal readers.**

Indian Farming and Harvesting

Four Seasons of Corn: A ***Winnebago*** *Tradition* We Are Still Here: Native Americans Today (**Indian Author**), First Avenue Editions, 1992.
Heetanka's Harvest by Jennifer Jones.

Indian Maple Sugar and Thanksgiving

Ininatig's Gift of Sugar: Traditional Native Sugarmaking, We Are Still Here: Native Americans Today (**Indian Author**), First Avenue Editions, 1993.
Manabozho and the Maple Trees *in Keepers of the Earth* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1988. **Anishinabe**
Circle of Thanks: Native American Poems of Thanksgiving by Joseph Bruchac (**Indian Author**), Bridgewater.

These materials would be good to use during the Thanksgiving season to let children know that it's more than the story of the Pilgrims and Indians. The fact that Indians contributed most of the foods we eat at Thanksgiving and their way of giving thanks should be stressed. Include local stories about food.

About Nutrition

The Food Pyramid by Joan Kalbacken, Children's Press, 1998.
Food and Your Health by Jillian Powell, Raintree/Steck Vaughn, 1997.
Nutrition: What's in the Food We Eat? by Dorothy H. Patent, Holiday House, 1992.

This material should be summarized and reported.

Poetry

Hungry Mungry and Sarah Cynthia Stout Would Not Take the Garbage Out in *Where the Sidewalk Ends* by Shel Silverstein, Harper and Row, 1974.

Also see page 146.

About the Literature for Phase Four

Indian people contributed many of the foods we eat today. Many Indian tribes were excellent farmers long ago before the white man came.

Indian Legends About Food

Sunflower's Promise by Gloria Dominic, Troll, 1996. **Zuni**
First Woman and the Strawberry by Gloria Dominic, Troll. **Cherokee**
How Food Was Given by Jeanette Armstrong (**Indian Author**), Theytus Books.

Food and Nutrition

Good Enough to Eat: A Kid's Guide by Lizzy Rockwell, Harpercollins, 1999.
What We Eat by Sara Lynn and Diane James, World Book Inc., 1994.
Sack Lunch by Bob Reese, Children's Press, 1992.
Mary Jo's Grandmother by Janice Udry, Albert Whitman, 1970. **Included in some basal readers.**

For Thanksgiving

American Indian Food by Jay Miller (**Indian Author**), Children's Press, New True Books.
Squanto's Journey: The Story of the First Thanksgiving by Joseph Bruchac (**Indian Author**), Harcourt, 2000.
The Corn Spirit in *Keepers of Life* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1998. **Tuscarora**

These materials should be used in the Thanksgiving season. Students should learn that it's about much more than the story about the Pilgrims and the Indians. The fact that Indians contributed most of the foods we eat at Thanksgiving and the way Indians regularly give thanks should be stressed. Include local stories about food.

Plants – Corn

Experiment with Plants by Monica Byles, Lerner Pub., 1993.
Corn by Elaine Landau, 2000.
From Seed to Plant by Gail Gibbons, Holiday House, 1991.
Corn – On and Off the Cob by Allan Fowler, 1977.

Information from these books should be summarized and reported.

Poetry

Me Stew and The Garden in *Where the Sidewalk Ends* by Shel Silverstein, Harper and Row, 1974.

Also see page 146.

About the Literature for Phase Three

Indian people contributed many of the foods we eat today. Many Indian tribes were excellent farmers long ago before the white man came.

About Food – Eating

What Food Is This? by Rosemarie Hausherr, Scholastic, 1994.
Something Queer in the Cafeteria by Elizabeth Levy.

Indian Stories Including Food

Waynabozho and the Wild Rice Keepers in *Keepers of Life* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1998. **Ojibwa**
Iktomi and the Berries by Paul Goble, Orchard Books, 1992. **Lakota**
Maple Moon by Connie B. Crook, Stoddart Kids, 1998. **Indian**
These stories can be retold.

For Thanksgiving

Nickommoh: A Thanksgiving Celebration by Jackie Koller, Atheneum, 1999. **Naragansett**
Corn is Maize: The Gift of the **Indians** by Aliki, Thomas Crowell, 1976.
The Thanks to Trees in *Keepers of Life* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1998. **Seneca**
These materials should be used in the Thanksgiving season. The students should know that it is more than the story of the Pilgrims and the Indians. The fact that Indians contributed most of the foods we eat at Thanksgiving and the way Indian people regularly give thanks should be stressed. Include local stories about food.

Seeds – Gardens – Food

Raccoons and Ripe Corn by Jim Arnosky, Mulberry Books, 1991.
All About Seeds by Susan Kuchalla, Troll, 1989.
One Bean by Anne Rockwell, Walker & Co., 1999.
Starting Science: Food by Kay Davis, Steck Vaughn, 1991.
Information from these books should be summarized and reported.

Poetry

I Scream, You Scream: A Feast of Food Rhymes by Lillian Morrison, August House, 1998.
Recipe for a Hippopotamus Sandwich and I Must Remember in *Where the Sidewalk Ends* by Shel Silverstein, Harper and Row, 1974.
Aslo see page 146.

About the Literature for Phase Two

Indian people contributed many of the foods we eat today. Many Indian tribes were excellent farmers long ago before the white man came.

Food and Eating

My Whole Food ABC's by David Richard, Vital Health Pub., 1997.
Lunch by Denise Fleming, Henry Holt, 1992.
Who Ate It? by Taro Gomi, Milbrook Press, 1991.

Indian Stories Including Food

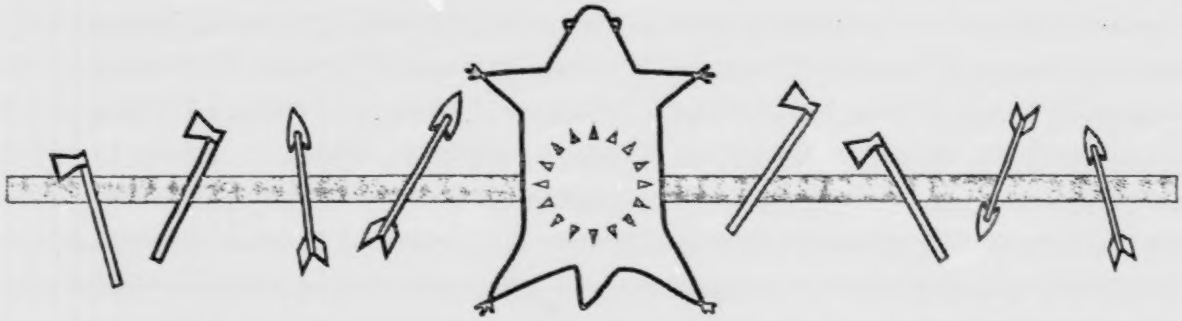
The First Strawberries by Joseph Bruchac (**Indian Author**), Dial Books. **Cherokee**
The Maple Thanksgiving by Joseph Bruchac (**Indian Author**), Celebration Press Pub., **Iroquois**
The **Indians** *Knew* by Tillie Pine, McGraw Hill, 1957.
These materials should be used in the Thanksgiving season. Students should know that it is more than the story of the Pilgrims and the Indians. The fact that Indian people contributed most of the foods we eat on Thanksgiving and the way Indian people regularly give thanks should be stressed. Include local stories about food.

Food – Gardens

Food Golden Books, 1995.
Food by Jan Pienkowski, 1991.
Edward Plants a Garden by Dale Gottlieb, Envision Pub., 1998.
Information from these books should be summarized and reported.

Poetry

With His Mouth Full of Food and Melinda Mae in *Where the Sidewalk Ends* by Shel Silverstein, Harper and Row, 1974.
Also see page 146.



Further Resources for Food Unit

These materials can be used to substitute for books in the suggested unit outline or for additional reading/other activities for students.

Tomatoes, Potatoes, Corn and Beans by Sylvia S. Johnson. **Indian**

Food: A Very First Picture Book by Nicola Taxworth.

The Hungry Little Boy by Joan W. Blos, Simon & Schuster, 1998.

Itsu Selu: **Cherokee** Harvest Festival by Daniel Pennington, Charlesbridge Pub., 1994.

The People of Maize in Keepers of Life by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1998. **Mayan**

Maple Sugar, Chippewa song in The Sky Clears by A. Grove Day, University of Nebraska Press, 1951. Also in American Indian Poetry by George W. Cronyn, 1962.

When the Corn is Red, **Tuscarora** legend retold by Pekay Shor, Abingdon Press, 1973.

In My Mother's House by Ann Nolan Clark, Viking, 1969. **Pueblo**

Circle of Seasons by Ann Nolan Clark, Giroux, 1970. **Pueblo**

Along Sandy Trails by Ann Nolan Clark, Viking, 1969. **Tohono O'odham**

Tohono O'odham, Lives of the Desert People, Tribal Education Department, 1984.

A Coloring Book of **Hidatsa** Indian Stories compiled by Roberta Krim and Thomas Thompson, Minnesota Historical Society, 1988.

Buffalo Bird Woman's Garden as told to Gilbert Wilson. **Hidatsa**

Walking His Talk in Signs of Tradition, Master's Project, University of Kansas, 1994. **Mandan**

Mon Daw Min – the Origin of Indian Corn in **Ojibway** Indian Legends by Cheryl Mills King, North Michigan University Press, 1972.

White Corn Sister by Peter Blue Cloud (**Indian Author**), Strawberry Press, Bowling Green Station, NY. **Indian**

Our Mother Corn, Daybreak Star Press, 1981. **Hopi, Pawnee, Seneca**

Indian Corn and Other Gifts by Sigmund A. Levine, Dodd, 1974.

Indian Harvests by William C. Grimm, McGraw, 1973.

Indian Harvest by Jannette May Lucas, Lippincott, 1945.

Corn for the Palace by Margaret Crary and Carroll Voss, Prentice-Hall. **Lakota**

Food the **Indians** Gave Us by Wilma and Vernon Hays, David McKay.

Why Corn is Golden by V. Blackmore, Little Brown, 1984. **Indian**

People of Corn: A Mayan Story by M.J. Gerson, Little Brown, 1995. **Mayan**

The Coming of Corn in Keepers of the Earth by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1988. **Cherokee**

In the Garden by C. M. Mamchur, Pemmican Pub., 1993. **Indian**

Full Worm Moon by Margo Lemieux. **Algonquin**

American **Indian** Food and Lore by C. Niethammer, Collier, 1974.

Native Plant Stories by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1995. Same stories as in Keepers of Life.

Native American Gardening by Michael Caduto and Joseph Bruchac (**Indian Author**).

All on Earth, Musical Companion to Keepers Books by Michael Caduto. **Indian**

Story Cards of North American **Indian** Tales by Susan J. Clark. Includes plants and animals in Keepers Books.

Little Boy Eats Too Much by Montana Council for **Indian** Education

The Big Tree and the Little Tree ed. by Jean E. Speare, Pemmican Pub., 1986. **Canada**

Why Saguaros Grow on the South Side of Hills in And It Is Still That Way by Byrd Baylor, Trails West Pub., 1976. **Southwest**

Indian Cookin' by Herb Walker.

Native American Cookbook by Edna Henry (**Indian Author**), Messner, 1983.

Southwest Indian Cookbook: **Navajo** and **Pueblo** Images, Quotes and Recipes by Marcia Keegan.

Thanksgiving Day: Greetings to the Natural World by John Stokes. **Iroquois**

CHECK YOUR LIBRARY OR BOOKSTORES FOR OTHER BOOKS RELATING TO THE TOPIC.

Books in italics are especially suitable for Phase One - for preschool children.

FOOD WORDS

BEGINNING SOUNDS

salt
sauce
salad
seed
seedling
seasoning
soda
soil
soup
sour
sunlight
supper
skillet
squash
slice
smoke
snack
spoon
spice
spicy
spinach
spaghetti
stuffing
stem
stalk
stew
stir
sweet

popcorn
potatoes
pot
pop
peas
pepper
peanuts
pemmican
pancakes
pinon
pie
pineapple
pumpkin
plate
plums
plant

carrot
cantaloupe
cake
candy
cabbage
corn
cook
cornbread
corn balls
cookies
cold
coffee
cranberries
crop

bananas
bake
beef
beans
beets
berries
buns
bowl
boil
botanist
biscuits
bland
breakfast
bread

fish
fat
fair
farmer
feast
fork
food
furrow
flour
fruit
frybread
freeze

meat
meal
milk
minerals
maple sugar
macaroni
manners
mutton

tea
taco
taste
tomatoes
turnips

COMPOUND WORDS

watermelon
blueberry
chokecherry
scarecrow
sunlight
pancakes
oatmeal

LONG VOWEL SOUNDS

slice
spice
ice cream
pie
pineapple
knifecake
plate
cake
bake
taste
grapes
hoe
chokecherry

weeds
seed
beef
beets
cheese
green beans
tea
seasoning
meal
meat
peanuts
feast

SHORT VOWEL SOUNDS

apples
snack
pancakes
plant
bland
macaroni
manners
jam
radish
candy
cantaloupe
dish
dinner

lettuce
chef
stem
dressing
pepper
pemmican
edible
venison
lunch
sunlight
supper
pumpkin
nuts

ANTONYMS

hot-cold
sweet-sour
spicy-bland
good-bad

SYNONYMS

delicious
scrumptious
good
tasty

OTHER WORDS

celery
vegetable
dry
oranges

onions
etiquette
jelly
vitamins

nutrition
hominy
irrigate
garden

gravy
water
olives
apples

sugar
chili
chocolate
cheese

Word walls should be maintained. Instructors should ensure that students know the meanings of all of these words in this context and extend vocabulary by noting how they may mean other things in other contexts or they may have homophones. Experiences, pictures and student illustrations should be used to explain and process word meanings. Words that rhyme with these words can be examined to see varying spellings for sounds. Other words can be added. Teach the meanings of sayings such as “being in a jam,” “crying over spilled milk,” “you take the cake,” etc.

Science Standards and Benchmarks for Food Unit

Standard – Understands that scientific inquiry works in particular wayss
Benchmarks
Understands that learning can come from careful observations and simple experiments
Understands the importance of careful description in science and how it allows comparison

Standard – Understands the main individual, social, ethical and institutional aspects of science
Benchmarks
Understands that learning can come from careful observation of plants and animals, but they should not be mistreated

Standard – Understands the processes that shape the surface of the earth and the relation of the surface of the earth to the living environment
Benchmarks
Knows that change is something that happens to many things around us
Knows that living things respond to the conditions around them

Standard – Knows about the diversity and unity that characterize life
Benchmarks
Knows that some animals and plants are similar in appearance and behavior, and others are very different from one another
Knows that stories sometimes give plants and animals attributes they really do not have

Standard – Knows the general structure and functions of cells in organisms
Benchmarks
Knows that most plants and animals need air, food and water
Knows that plants and animals are composed of different parts, serving different purposes and contributing to the well-being of the whole organism
Understands that magnifiers can let us see things that we don't expect

Standard – Understands how species depend on one another and on the environment for survival
Benchmarks
Knows that plant and animal species depend on each other to maintain life, e.g., many plants depend on animals for carrying their pollen to other plants or dispersing their seeds

Standard – Understands the cycling of matter and flow of energy through the living environment
Benchmarks
Knows that plants and animals both need water, animals need food to eat and plants need light

Standard – Understands the basic concepts of the evolution of species
Benchmarks
Knows that plants and animals have features that help them live in different environments
Knows that cultivated plants result from selective breeding for particular traits

Standard – Understands the conditions necessary for maintaining good physical health and why they are necessary
Benchmarks
Knows that eating the "right kinds" of food help people to stay healthy

Standard – Understands how germ theory differs from earlier notions about what causes illness and how germs were discovered and linked to disease
Benchmarks
Knows that cleanliness and care in the handling of food help people to keep from getting sick

Standard – Knows about patterns of change and constancy
Benchmarks
Knows that some changes can be detected by taking measurements
Knows that sometimes making up an experiment helps us to learn more about how something happens

Math Standards and Benchmarks for Food Unit

Standard – Effectively uses a variety of strategies within the problem solving process
Benchmarks
Brainstorms possible things to do
Draws pictures to represent problems
Represents problem situations using physical objects
Clarifies problems using discussions with teacher or knowledgeable others

Standard – Understands and applies basic and advanced properties of numbers
Benchmarks
Has a general understanding of the concept of number
Uses counting to exemplify numbers

Standard – Uses basic and advanced procedures while performing computation
Benchmarks
Adds, subtracts, multiplies, divides whole numbers with accuracy
Adds, subtracts, multiplies, divides decimals with accuracy

Standard – Understands and applies basic and advanced methods of measurement
Benchmarks
Understands the basic characteristics of weight and how it is measured

Standard – Understands and applies basic and advanced concepts of data analysis and distributions
Benchmarks
Has a basic understanding of the concept of data

Language Arts Standards and Benchmarks for Food Unit

Standard – Gathers information effectively through reading, listening and viewing
Benchmarks
Provides an accurate retelling of the basic plot of simple stories the student has read, heard or viewed
Provides an accurate retelling of the main idea of simple expository information the student has read, heard or viewed
Understands that reading, viewing and listening are ways of gaining information about the world
Determines meaning of simple words from context
Creates mental representations for concrete information read, heard or viewed

Standard – Reads and responds to literature
Benchmarks
Understands that stories have beginning, middle and ending episodes
Understands the genre of legends and fables

Standard – Communicates ideas and information in writing
Benchmarks
Understands basic connections between spelling patterns and speech sounds
Understands basic phonological patterns in English
Expresses ideas in simple expository forms
Composes simple stories that express cohesive ideas

Standard – Understands and applies basic principles of language use
Benchmarks
Recognizes characteristic sounds and rhythms of language
Makes valid observations about the use of words

Standards and Benchmarks from *The Systematic Identification and Articulation of Content Standards and Benchmarks*, Mid-continent Regional Educational Laboratory, 1994.

American Indian Content Standards for Food Unit

Science

Life Science –
Indian students should develop an understanding of plant and animal life cycles as exemplified in traditional American Indian concepts such as the Medicine Wheel.

Earth and Space Science –
Indian students should develop an understanding of properties of earth, air, water and fire and how they served as a basis for traditional American Indian production of food.

Science in Personal and Social Perspectives –
Indian students should develop an understanding of elements of nutrition and how they were applied in the diets of American Indians prior to the arrival of the Europeans.

History and Nature of Science –
Indian students should develop an understanding of elements of botany and ecology which have benefited from the contributions of American Indians.

Language and Literacy

Indian students should be able to –

Listen for meaning and gain information from spoken English and a Native language.

Listen to Indian stories told in the oral tradition, comprehend their teachings and be able to retell them.

Speak coherently, conveying ideas in both English and a Native language.

Read fluently and independently, a variety of materials including those with American Indian themes.

Mathematics

Mathematics as Problem Solving –
Indian students should formulate problems from everyday and mathematical situations within their home and tribal/community worlds.

Mathematics as Communication –
Indian students should relate their everyday language to mathematical language and symbols including expressing mathematical concepts in their Native languages.

Estimation –
Indian students should explore estimation strategies through activities derived from their cultural worlds such as estimating the number of sheep/horses that fit in a pen/corral.

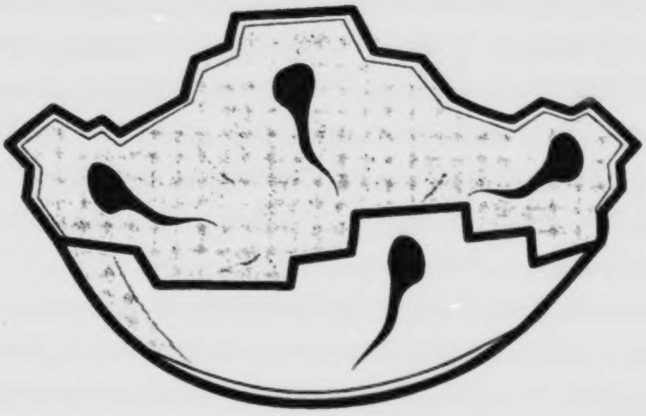
Fractions and Decimals –
Indian students should apply fractions and decimals by applying them to real world situations using Native cultural experiences.

– ORBIS Associates for Office of Indian Education Programs, BIA, 1996

Example Activities Developed by Teachers of American Indian Students

Workshop on Culturally-Based Math and Science Curriculum Development

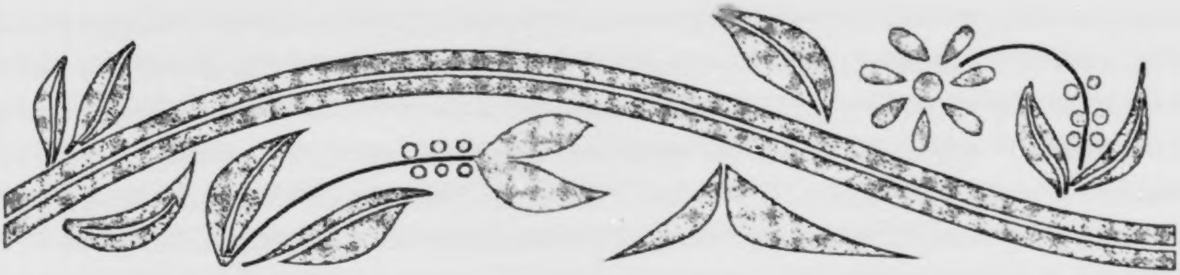
Haskell Indian Nations University
1992 & 1993



Ideas included should be adapted for appropriateness.

My Roots of Learning

Like the birth of a tree, I journey my world
as a young seedling ever so curious. I am at one
with the tree, growing in my own environment.
I learn through mistakes, taking risks and questioning
the wonders of life. As I struggle to overcome
obstacles and barriers, I develop stronger roots
to stand firm and branch out to learn about my world –
beyond me and beneath me....all around me.
I will hold fast to my beliefs and values
like the strength of a trunk to
become a unique individual.
I can live in my world to face the ever changing
world successfully wherever I journey.
This can only happen if I have a special teacher
to guide me ever so patiently in wisdom
and knowledge of living harmoniously
and respectfully with Mother Earth.
You see, I am special, just like you.



SCIENCE

Environmental Harmony

Cultural Objective

Students will understand that historically, tribal life styles were dependent upon plants for their personal and environmental necessities.

Math Objective

Students will learn about plant and animal growth and identify its relationship to the five senses.

Science Objective

Students will learn about plant and animal growth and identify its relationship to the five senses.

Teacher Background Information

Native American people have always tried to live in harmony with nature. This implies that they truly understand nature. Plants have helped them relate the environment to their daily needs. Many of the observations of nature and plants were based on the use of the five senses: hearing, taste, smell, sight and touch.

Native people depend on nature to survive. They used plants as a daily supply of food, medicines, clothing and transportation. Identification of plants and their basic functional parts served as a link to harmony in nature.

Native Americans ate many foods unknown to the first European settlers. Examples of these foods are corn, potatoes, pumpkins, squash, string beans, peppers, sunflowers, maple syrup, tomatoes, strawberries and wild rice. Perhaps one of the greatest contributions of the Native Americans is the introduction of new foods into an otherwise bland diet. More than half the food consumed today comes from Native American sources.

Student Learning Activities

1. Take students on a field trip to an area with various types of native plants. Discuss these plants and use the five senses to create a "Sense Chart of Plants."
2. Give each student a seed to plant in a milk carton. Some interesting seeds include grass, beans, peas, corn and other plants that grow above the surface of the ground. Make charts or draw pictures of different stages of development.
3. Ask parents or guardians to prepare a tray of various native foods. Students can take turns being blindfolded; then, by feeling and guessing, they can identify the various foods.
4. Take a field trip to a nature area or a grocery store. Have the students select two foods and describe them in terms of the five senses. Tape record or video these statements. Show them to the class on its return.
5. Invite other classes to view students' drawings of foods and plants, and have them take part in a tasting contest.

Evaluation

Set up a bulletin board or display table of foods that can be described in terms of the five senses. Discuss these and categorize them into the four food groups. Invite an elder of the tribe to the class to discuss the traditional significance of the foods.

Resources

American Indian Engineering Society. *Hands On/Minds On*. Boulder, Colorado, 1979.

American Indian Institute. *Native American Cultural Lessons Preschool Through High School*. Norman, Oklahoma: University of Oklahoma, 1987.

Madison County Title V Program. *Indian Education Curriculum Guide*. Madison County Technical Center, Huntsville, Alabama, 1989.

Westley, Joan. *Weeds and Seeds*. Sunnydale, California: Creative Publications, 1979.

Developed By

John Wray

MATH AND SCIENCE

Seeds

Cultural Objective

Students will demonstrate a knowledge of how seeds were used in their native culture.

Math Objective

Students will:

relate multiplication to skip counting
find the area of rectangles by using simple grids
make simple picture, bar and line graphs

Science Objective

Students will:

use observation skills
use classification techniques
communicate by using scientific vocabulary
analyze data
analyze ways animals and plants are used by people

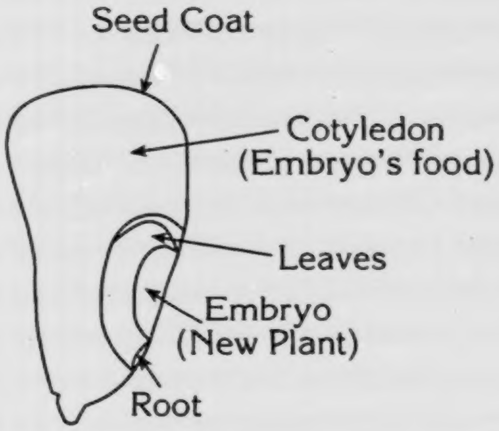
Teacher Background Information

Seeds are an important part of the Native American culture. They are used as a major source of food, whether they ground seeds into flour, ate them whole or used them to start new plants. Seeds have been cultivated by humans for thousands of years.

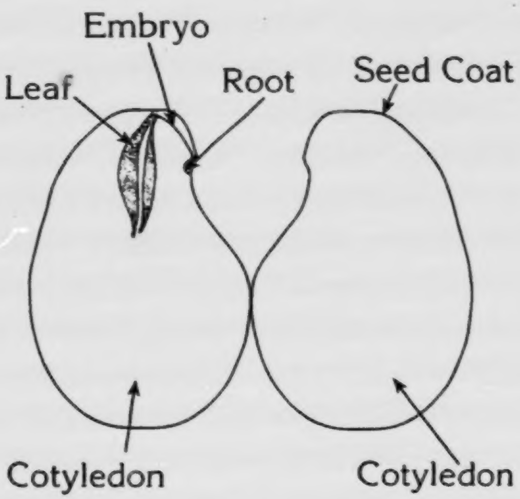
They are spread through nature in a number of ways. Some are spread by wind, water, animals or birds as well as by the plant themselves through plant adaptations. Wind-spread seeds include dandelion, milkweed and tree seeds. Animals and birds spread seeds in their body coverings as well as through their droppings. Some plants are designed to spread their seeds by expelling them from their pods.

There are two types of seeds, classified by the number of parts that make up the food source. One type of seed, called cotyledon, has a two-parts food source. Beans are an example of this type of seed. The other type of seed has a one-part food source. An example of such a seed is a corn kernel or squash seed. Refer to illustration below.

Seeds initially grow and sprout roots and a stem by a process called germination. For seeds to germinate, they must have moisture and heat.



Corn Seed

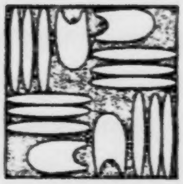


Bean Seed

Student Learning Activities

1. Look at a large dry lima bean. Remove the seed coat and split the seed. Describe the different parts of the seed.
2. Put three dry lima bean seeds between two damp paper towels. Seal these seeds in a plastic bag. Place in a warm dark place overnight. Check the seeds the next day and discuss the ways in which these seeds look different than before. Experiment with other conditions for germinating seeds. Record the findings.
3. Give students a container of different kinds of seeds. After dividing the students into small groups, have them sort and classify the seeds. Ask each student to move to another group and decide what characteristics were used to group the seeds.
4. Provide a variety of seeds for the students to use in making a seed collage. Have the students arrange the seeds in a pleasing design on a piece of heavy paper covered with white glue. Make sure the glue is fairly thick to hold the seeds.
5. Instruct students to count the number of seeds in a grouping by a multiple number (3, 9, 12, 15...).
6. Show the students how to arrange seeds in row and column configurations and express in math terms:

   3 seeds x 4 seeds = 12 seeds or 6 seeds x 6 seeds = 36 seeds.
7. Have students use a picture or bar graph to record how many different kinds and types of seeds they have in a small container of mixed seeds.
8. Germinate a number of seeds of the same or different kind and graph the results of this experiment. Note how many of each kind germinated and which kind germinated the best. Let the seeds grow for a few days and measure the growth of the root and/or the stem and leaves.
9. Invite an experienced community member to demonstrate the grinding of grain and to explain how and why grain is used in Native American ceremonies.



Evaluation

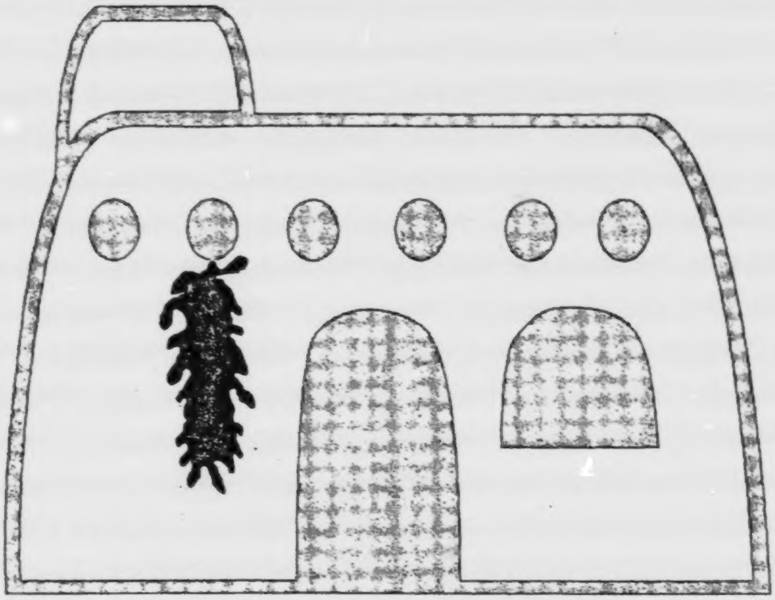
1. Give each student a few seeds and ask each to demonstrate the process of germinating the seeds.
2. Have the students label the parts of the seed.

Resources

Ditter, Howard J. *Modern Plant Biology*. New York: Van Nostrand Reinhold Company, 1972.

Developed By

Nancy L. Roehi



SCIENCE

Plants Used As Food

Cultural Objective

Students will use the experience of planting and raising seeds to develop their understanding of the importance of nature in their lives.

Science Objectives

Students will:

grow seeds that produce a native food source

learn the characteristics of seeds and plants.

Teacher Background Information

Native Americans use different plants depending upon the area in which they live. The Cherokee use ramp, wild greens, wild onions, cabbage, and roots for tea. In Iowa, the Mesquoki use corn and squash. Northern Indians use rice and squash. The Navajo use corn, squash, potatoes, beans, berries, wild onions, carrots, garlic, acorns, pinon nuts and yucca fruit. Sioux use wild berries and turnips. Plants used by the Tohono O'odham are corn, palo verde, pumpkin, fruit of the yucca, beans of mesquite, saguaro fruit, cholla buds, squash, beans and prickly pear cactus.

Cactus Gathering, by Ruth Underhill, is a story which can be used to set the stage for this lesson.

Cactus Gathering

As the girls come back from getting water, Flowering Rainbow says, "We saw a ripe fruit on the giant cactus." "It's too soon," says mother. "Why, only the other day I saw flowers, not fruit." "Come and see!," say the girls, laughing and pulling her. "Come and see the old cactus right near the house."

The giant cactus is a plant that grows nowhere else but in the desert country of the Southwest, in California and in Mexico. Mexicans, in their language, call it saguaro (pronounced sa-war-o) and that is the name people use most often. There is no other plant in the world that looks like it. The plant is twice as tall as a man and much thicker. "See, my father's mother!," says Flowering Rainbow, as Grandmother follows the girls to the old saguaro. "See! Only one flower left. But there are fruits, nine, ten, one past ten, two past ten, and one is ripe." She points to the top of the plant.

This old saguaro has no branches, but it is like a tall green pole. The fruits are all at the top like a flock of birds perching close together. There is just one white flower left. It is as big as the flower called a lily by the white people. The others have turned into little fruits, and one is as large as an egg. A ripe one! There is the prickly pear, with leaves like flat, green plates covered with thorns. Its fruits are red and juicy and the girls run about looking for ripe ones. When they find them, they brush the thorns off with a stone, crack open the fruit, and suck out the dark red inside. There are almost more seeds inside than fruit and, with every bite, they get a mouthful of seeds as big as beans which they spit out. But they have had nothing sweet since last year and they eat all they can. "Don't make a mistake," says Grandmother, "and get the kind that gives you chills and fever." The girls laugh. "We know which is good to eat." Among the prickly pear plants is cholla (pronounced choya), which looks like a pretty bush covered with little white flowers until you get near enough to see that the flowers are really thorns. Then you must not go nearer, because the thorns almost jump out to catch hold of anything that goes by. White people call it the jumping cholla.

There is the kind of cactus that white people call a barrel. It is like a thick little post, stuck in the ground, with deep ridges going down its sides and big black thorns growing along the ridges. Grandfather picks up a large stone and mashes the top of the cactus. Then he takes a stick and lifts off the green outside covering with thorns. Inside, the cactus looks white and wet.

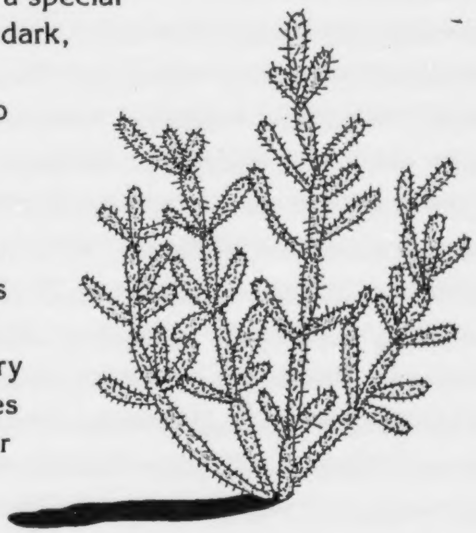
Grandfather takes the gourds he carries for a drinking cup and pushes it down inside. Soon it is filled with whitish water. "We don't have any use of water while this is here," he says. They all drink and, though the water tastes sour, there is plenty of it. "Remember," says Grandfather, "nobody has to die of thirst where the barrel cactus grows." Each person has a pole, as long as the tallest saguaro, for they have to hook the fruit down from the very top. Of course, there is nothing in the desert long enough to make such poles, so they use two sticks tied together. The sticks are the thin, smooth ribs of the saguaro itself, tied with strips of deerskin. That makes a long, thin pole. Near one end, it has a very short stick tied almost crosswise. This acts as a hook which catches the stems of the fruit and pulls them loose. Further down, there is another hook to use for the lower fruits. The little sticks are tied on at an angle, so that you can either push at the fruit from underneath or pull from above.

Mother takes a huge basket to fill with fruit after it is picked. The basket is shaped like a bowl and it is as big as the circle of her arms when she holds them out. The basket is made of willow stems, with a black pattern of Devil's Claw. She cannot set the basket on the ground for the ants would get the fruit. She sets it in the branches of a bush.

Then each woman takes a smaller basket to pick into. Flower Tips is already very good at holding the pole, so her stick quickly hooks one of the big, egg-shaped fruits, and the fruit comes tumbling down. If it is very ripe, it breaks when it falls and shows its inside, like a dark, red jelly full of seeds. The cactus fruit has a hard shell covered with thorns. If it does not break, the women have to cut it open. The have no knives and, generally, they use fingernails for thorns will scratch their hands. They pull off the stem of the fruit itself, which has a hard edge where it joins the shell, and use it for cutting.

It takes only a few moments for Mother to get all the ripe fruits from one saguaro, leaving the green ones to be picked later. Soon she fills her small basket, empties it into the big one and goes further away. The fruit ripens so fast that every day, there is more on the same plants. White people cook the fruit and close it up in glass jars. Sometimes they dry it. But the cactus fruit they always cook, and they make more things out if it than anyone could guess. Mother has a special cooking pot for the saguaro fruit. After cooking, the dark, red juice is strained off with a strainer made by Grandmother. It is simply a basket, woven loosely so the juice will go through and the seeds remain.

Juice is only the beginning. Some of the dark fruit and the seeds are left and that is cooked again until it makes jam. Everybody loves this jam because it is sweet. As Mother gets enough, she puts it into clay jars and fastens the top with a broken piece of pottery stuck on with mud. She will use it as gifts for relatives when she goes visiting, and Father will take some far over the mountain to trade for other goods.



1. How do containers make plants more interesting?

   Choose an attractive container. Fill it with potting soil. Plant a seed just below the surface of the soil. Keep the soil moist and watch your plant grow. If you choose a grapefruit or orange rind for a container, you might want to try a matching grapefruit or orange seed. Seeds will sprout in almost any container that will hold potting soil. Plants in small containers, such as egg cartons, will need to be transplanted without disturbing the root system. This can be an opportunity to emphasize creativity and develop an appreciation for the beauty of plants.

2. How can we watch seeds grow?

   Soak bean seeds for 24 hours. Put a damp sponge around the inside surface of each tumbler. Put eight seeds between the sponge and the side of the tumbler. The seeds should be placed 1 inch apart. Check the sponge every day. Be sure it is moist. Put one tumbler in a dark location. Place your other tumbler in the light of the classroom. Observe your seeds daily. After several days, the beans will begin to sprout. The seeds kept in the dark place should sprout at about the same time as the ones in the light. Remind the children that many plants begin their lives in the dark, below the surface of the soil. As the seeds continue to sprout, turn one tumbler on its side. The sprouts will change their direction of growth and grow downward.

3. Discuss the plants used by the Sioux: corn, red plums, numerous types of berries and nuts, and prairie turnips.

4. Make Wasna (a special treat for Sioux children)

   1 lb. dried chokecherries (other cherries with do)
   1 cup shortening or tallow
   1 cup sugar

   Grind up the choke cherries, add shortening, then add sugar. Form into balls the size of golf balls.

5. Make Wojape (a very good dip for fry bread)

   1 small can of berries (unsweetened)
   2 cans water
   $^1/_2$ cup of flour or corn starch
   $^1/_4$ cup of sugar to sweeten

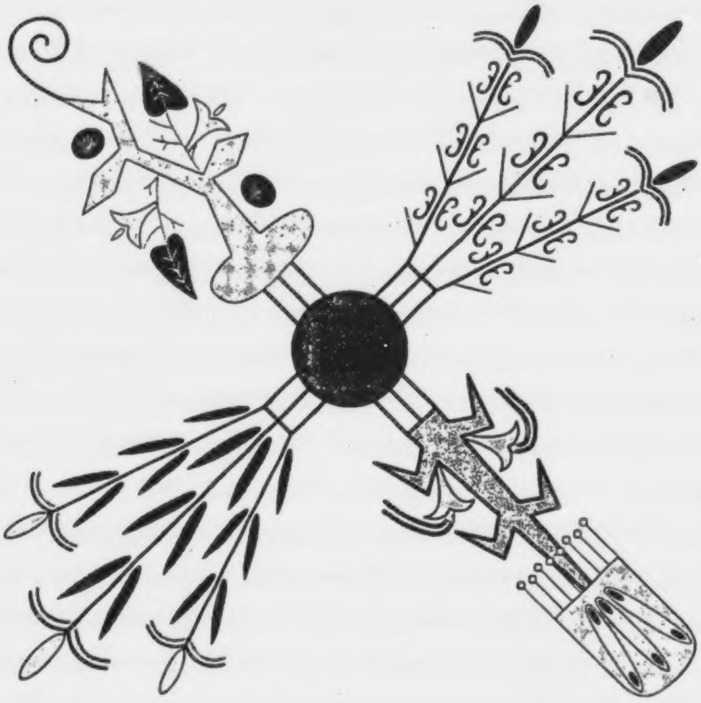
6. Remind students that foods come from plants. Point out that parts of many plants can be eaten. Explain that some parts of a plant may be safe to eat while

other parts of the same plant may be harmful. Tell children not to eat any part of a plant without first getting permission from the adult who takes care of them. Display a carrot. What part of a plant do you think this carrot is? Help them to understand that is a root. Exhibit celery, broccoli, lettuce, peas and tomatoes. Help students to understand that celery is the stem of a plant; lettuce is the leaves of a plant; broccoli is made up of the flowers of a plant; peas are seeds and tomatoes are the fruit of a plant. Afterwards, enlist children to help wash foods and prepare a snack.

7. Bring to class a variety of seeds, such as watermelon, orange, apple, peanut, bean, peach, sunflower, corn and pear. Have children identify each seed and consider the color, shape and size. Students will learn that the seeds of different plants look different from another, but they are alike in that each will grow into a plant of its own kind.
8. Invite an elder to go on a field trip to help identify a variety of plants in the local environment.

Wild Celery

A small plant that grows almost flat on the ground. For the best taste, it should be picked early in the spring before the flowers bloom. It is dried and used in soup and stew. Latin: cymopterus glomeratus. Navajo: hazo'oleeh.



Evaluation

1. Play a game of matching the plant with the food.
2. Draw pictures of the plants and name them.

Resources

Casteller, Edward F. and Underhill, Ruth. *The Ethnobiology of the Papago Indians.* Albuquerque, New Mexico: University of New Mexico, 1978.

Underhill, Ruth. *People of the Crimson Evening.* United States Indian Service, pp. 40-49. No place or date given.

Nurge, Ethel. *The Modern Sioux.* Lincoln, Nebraska: University of Nebraska Press, 1970.

Dennis, Judy, et al. *Science.* New York: Harcourt, Brace, Jovanovich, 1985, pp. 64-73.

Developed By

Georgie Riley
Mary Stonehouse
Carol Martin

SCIENCE

How Does Water Help Mother Nature?

Teacher Background Information

Each tribe will have their way of using water for cleansing. For example, among the Navajo of the Southwest, hair is first washed with water and then corn meal is used to dry with. A Native resource person could be brought in to talk to the children about how water is used for cleansing among Native people.

Read to the students the story, "Season Suite" in *Keepers of the Earth.*

Student Learning Activities

1. Share with the students a dried celery stick and a fresh celery stick and ask them what happened to the dried celery stick? Which celery stick will weigh more and why? If a scale is not available, have the children hold the dry celery in one hand and the fresh celery in the other hand. Does celery contain water and where is it kept?

   To show how water moves up from the ground into plants, let the children examine celery which has been standing in the red solution. The red lines in the stalk show where water travels in plants. These are the plants "pipelines." Water in the plant pipelines carries dissolved food from the soil throughout the plant.

   Let the children examine plant or weed roots. Help them imagine how the "pipe system" begins in the tiniest root hairs. These root hairs take in dissolved plant foods and carries them throughout the plant where growing cells need feeding.

   To help children understand their own "pipe system", have them look at the veins in their wrists. Ask: can you name the other parts of your body's pipe system? (Veins, arteries, tissue, organs, etc.) How does your pipe system get its water? (From the food you eat.) What would happen if you stopped eating and drinking? (You would die.) You are telling them that we need water to live.

2. Take 2 plants from your area and plant in paper cups. Water one plant and not the other. Make a chart showing the growth of the plant watered and the lack of growth in the plant not watered.

Evaluation

Have the children dictate or write individual stories entitled "A Day Without Water." Read the stories to the class and consider assembling the stories into a journal for the class library.

Materials

Celery sticks – both dried and fresh
Red solution (water and red food coloring)
Small food scale
Writing paper
2 plants
Soil
2 paper cups

Resources

Caduto, Michael J. and Bruchac, Joseph. *Keepers of the Earth.* Fulcrum Inc., Golden, Colorado, 1989.

Project Wet Montana. *Water is Our Best Friend.* Bozeman, Montana: Montana State University, 1993, pp. 5-6.

SCIENCE

Mushroom in the Rain

Teacher Background Information

Tell the students you will read a story of how water affects animal and plant life. It is vividly illustrated in the story. Read the story "Mushroom in the Rain" by Mirra Ginsburg. Discuss how water affects animal and plant life. What happens to the animals and plants when it rains?

Student Learning Activities

1. To illustrate what happens to mushrooms when it rains, use a dry sponge. Pour water on it slowly. The sponge will swell up with water.
2. Retell the story to someone using a felt piece.
3. Name the animals in the story and find out what happens to them when it rains.
4. Choose an animal or a plant. Draw the animal or plant. Then write what will happen to you when it rains.
5. Rewrite the story using different animals and plants.

Another reading suggestion is *All Wet! All Wet!* by James Skofield.

Evaluation for Unit *(Performance Based Assessments)*

Each student will create, design and write a book based on the information learned in the preceding lesson for our water unit.

Each student will have a portfolio maintained and updated throughout the water unit including samples of their writing, illustrations, pictures of models and/or experiments and teacher narratives.

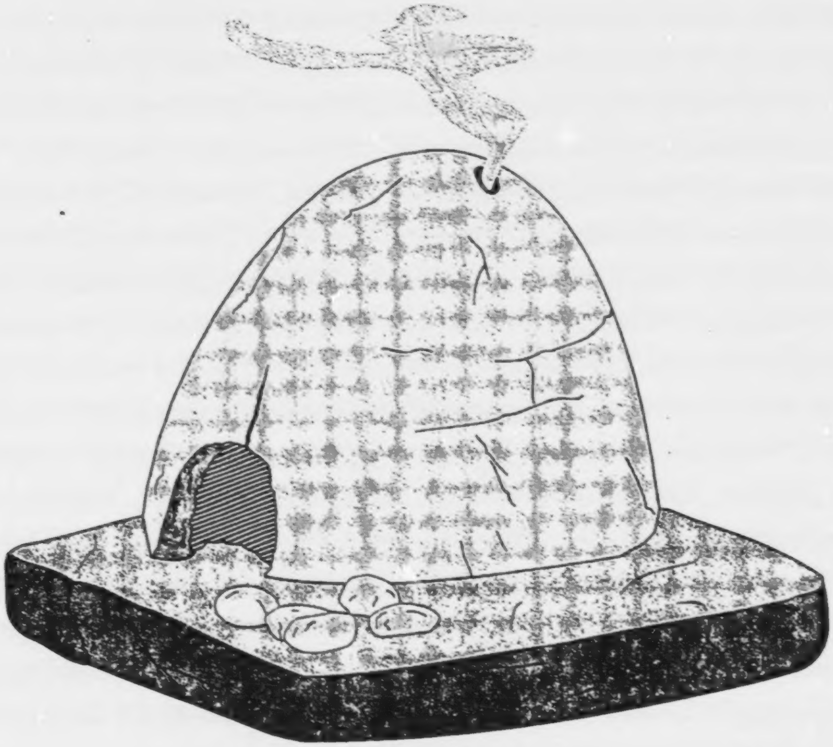
Resources for Unit

Berger, Melvin. *The New Water Book*. Thomas Y. Crowell Corp.: New York. 1973

Boyle, Marie E. *Water: Its Form and Motion*. Beacon Press: Boston, Massachusetts. 1961.

Caduto, Michael and Bruchac, Joseph. *Keepers of the Earth*. Fulcrum, Inc.: Golden, Colorado. 1988.

Clobe, Rene. *A Child's First Book of Poems*. Golden Press: New York. 1981.



SCIENCE AND MATH

Water and Farming

Teacher Background Information

Water, plants and animals are interdependent because they are part of a circle of life. Respect for Mother Earth and above all respect for the great spiritual force that stands behind all and makes life possible and worthwhile is an important value for many Native American people. Pueblo Indian religion strongly focused on fertility, moisture and the harmony of all life forms in Nature.

Water is our most precious resource. Successful management of land is related to good water management. Water is especially important to farmers and ranchers. The irrigation of crops, for livestock to graze in green pastures is a very important part of our food chain.

Farming is also one of the most important occupations in the world. People cannot live without food, and nearly all the food they eat comes from crops and livestock raised on farms. Crops raised to supply food for the world's population are called food crops. Many of these are shipped to markets as soon as possible after harvesting. Crops raised for livestock are called feed crops.

There are also special crop growing methods. One method is the organic method in which crops are grown without the use of chemicals. This method of farming protects the soil and water. Another method used is hydroponic farming. This method is the science of growing crops in water. Chemicals are added to provide nutrients that normally come from soil and could harm water.

When rainfall is scarce, farmers must irrigate their crops. Farmers living in dry regions must build canals, pipelines and tunnels to carry water from rivers and reservoirs. Irrigation systems contribute to raise food production and thus improve health quality of life and social conditions.

The Pueblo Indians of the Southwest are skilled desert farmers. At one time they raised crops with the aid of an elaborate system of water control and storage of water in mesa top reservoirs from which it was diverted by conduits into their fields.

Native Americans believe the earth is the mother of all creatures, and that the land belongs equally to all those who live upon it. America's future depends on how well we take care of it. Whatever affects the water affects all living creatures on Earth.

Student Learning Activities

1. Look at a map of your state and the map of the United States.
    a. Find the areas used for farming.
    b. Are the farming areas near a water system?
    c. Are the farming areas near large urban areas?
    d. Where and how do the farmers get their water supply?
2. Visit a library to find out about early irrigation systems used in your area.
    a. Report on findings from the research.
    b. Illustrate the systems used.
3. Invite an elder community member to talk on early farming practices in your area.
    a. Students should be ready with questions.
    b. Students will write out a short report on the information from the presentation.
4. Plant some seeds and keep a record on growth, color and texture.
    a. Students will create a chart and will graph the growth of the plants.
    b. Students may conduct other experiments with different types of soil and the amount of water given the plants. Place plants in a well lit area of the room and one in a dark area to record growth.
    c. What conclusions can be drawn about water and plants?

Evaluation

1. From the classroom presentation by the elder, students will be expected to do a writing project. In this project students should note the farming methods used today and methods used in the past.

Resources

World Book Encyclopedia, Vol. F/7, Pub. World Book, Inc. a Scott Fetzer Company, Chicago, copyright 1989.

Harrison, C. William. *Conservationists and What They Do.* Franklin Watts, Inc., 1963.

Water Use Handbook. Water Wise, U.S. Department of the Interior Bureau of Reclamation.

SCIENCE

Eating Healthy

Teacher Background Information

The life cycle is a basic part of all life. Eating properly and making use of Mother Nature's bounty is a duty of mankind. A sound mind and body contributes to the good of the group which is a basic concept throughout all of the Native American traditions.

Student Learning Activities

1. Read the story "The Coming of the Corn" from the book *Keepers of the Earth*.
2. Display empty food containers or pictures and invite students to identify the foods and food groups represented. Explain the Food Pyramid grouping to students which recommends which foods are needed for a good diet.
3. Choose various students to place the foods in proper food groups and discuss the ways in which the various food items might be consumed.
4. Develop a wall chart and have the students select an item and name ways that it may be prepared or in a natural form.
5. Have the students describe one meal they have eaten from the previous day and place the items in the proper food group.
6. Students will divide into small groups and they will cut out pictures from a chosen food group and construct a poster of a picture chosen.

   Students will put their pictures drawn on the bulletin board that depict various ways that food is grown. The food could be grown underground, in the trees, vines and in stalks.
7. Students will develop math readiness skills by explanation of basic fractional units. Cut various fruits into halves and fourths. Encourage the students to count how many pieces they have when a food item is cut into halves and fourths.

Evaluation

Set up a tasting table representing each of the food groups. Display foods of the various food groups cut into sections representing fractions. Ask students to identify how many fractions the food has been prepared in. Invite each child to take a food and taste it.

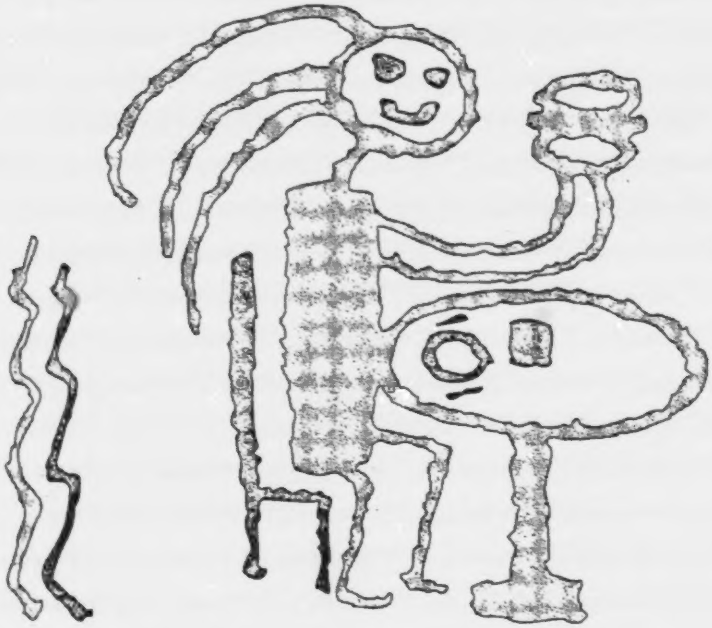
Materials

Paper
Pencils or markers
Food items from the food groups
Table knife
Paper plates

Resources

Blackwood, Bueschen, Gidderage and Caren. *HBJ Science.* Harcourt and Brace Publishers, Chicago, Illinois, 1989, p. 137.

Caduto, Michael and Bruchac, Joseph. *Keepers of the Earth.* Fulcrum Inc., Golden, Colorado, 1989, p. 137.



MATH AND SCIENCE

Native American Frybread

Cultural Objective

Students will learn more about frybread, an important traditional food in the lifestyles of many Native Americans.

Math Objectives

Students will:

illustrate fractional parts of whole objects or sets of objects

measure lengths using nonstandard units, centimeters and inches

order fractions on the basis of concrete materials

describe three-dimensional objects from different perspectives

identify and name common two- and three-dimensional figures (cube, cylinder, pyramid, ball).

Science Objectives

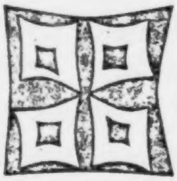
Students will:

interpret data from graphs and charts

make inferences from data and observation

observe that all things take up space and have weight

communicate by using basic scientific vocabulary.



Teacher Background Information

Among all tribes, each meal and its preparation is preceded by prayer. Although the words of the prayer may differ from tribe to tribe, the universal spirit of reverence and giving of thanks are reflected throughout preparation and eating.

This lesson will demonstrate the cooking of frybread which is a basic food for many tribes. Methods of preparation may vary between tribes. Different tribes may use different grain sources for the flour, depending upon the availability of different grains in that geographic area.

The most common grain used to make frybread is wheat flour, however, acorn flour is also used. The dough mixture is generally prepared by measuring the ingredients by hand because originally there were no measuring utensils available. Native women were quite adept at mixing the precise amount by using a "handful" or "pinch" of each ingredient. They would knead the dough to the right consistency. Usually, the dough was pinched off in chunks or balls and hand rolled or patted into the desired shape. It was then fried in a container of hot fat. It was fried to a golden brown and either served with a main dish or eaten alone.

Student Learning Activities

1. Ask the students to recall how their grandmother makes frybread. Discuss how people used to make frybread by nonstandard measurements – handful and pinch. Then ask the students to decide if their grandmother's handfuls would be the same as their's.
2. Have students measure handfuls of sand, rice and small beans, and place the quantity on paper plates. Next, have students compare their handfuls with each other. Ask if their handfuls were bigger or smaller than those of other students. Let students experiment to see if they could find a way to increase their handfuls. What did they conclude? Point out to the students that the handfuls are not equal for every person. If they are going to make something by using handfuls, they will not get the same amount every time and that is why this process is called nonstandard measurements.
3. Give each group a standard cup measure. Group members will choose one of the items (sand, rice or beans) and see how many handfuls it takes to fill the cup, but not overflowing. Chart this information on a graph. Discuss the graph.
4. Have students guess which measure ($^1/_2$ cup, $^1/_3$ cup, or $^1/_4$ cup) their handful can fill without overflowing and how many of these cups are needed to fill the one cup measure. Discuss the difference between nonstandard units of measure and standard units and the need for standard units.
5. Before students begin to make frybread, discuss and identify the three states of matter: liquid, solid and gas. Use the recipe to identify examples of each state. Reminder: baking powder (sodium bicarbonate) will be considered both a solid and a gas (carbon dioxide).
6. Have class make frybread. Observe the physical changes in the dough which results from the addition of baking powder which is composed mostly of sodium bicarbonate. The baking powder when mixed with flour and water will chemically generate the gas, carbon dioxide. The carbon dioxide gas makes the dough rise. An experiment to show why the dough raises can be performed by pouring vinegar on the baking powder, producing carbon dioxide bubbles.
7. Divide the dough into equal portions about 3" in diameter. Give one portion to each student to work into a ball. Discuss the geometric shape of a sphere and what shape you make when you flatten a sphere. Discuss the difference in circumference of the sphere and circle by measuring with a piece of string.
8. The teacher should place a cast iron skillet on a heat source. Place the lard into the pan. Discuss what is happening to the lard and why. (Heat changes a solid to a liquid.) Remind the students of the safety techniques they need to use when cooking with a pan that contains hot shortening.

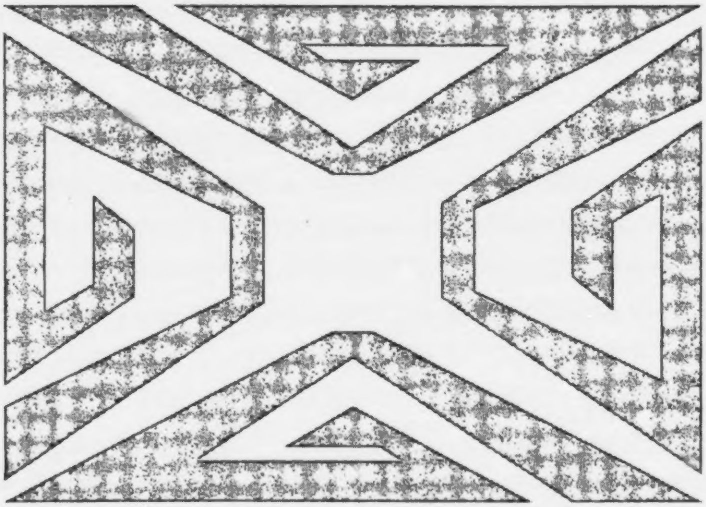
9. Observe the physical change of dough to firm bread. Place the formed dough carefully into the hot shortening. Instruct students to watch what is happening. Ask why the dough changes while in the pan. Cook until golden brown on both sides. Cut the bread in half and have the students observe the air pockets in the bread produced by the carbon dioxide.

10. Have students cut their bread into equal parts. Designate groups to cut their bread into halves, quarters, thirds, sixths and eighths. Compare the sizes of their pieces with other groups. Ask which is bigger, e.g. $^{1}/_{2}$ or $^{1}/_{4}$, $^{1}/_{4}$ or $^{1}/_{8}$, $^{1}/_{3}$ or $^{1}/_{4}$, and $^{1}/_{2}$ or $^{1}/_{8}$.

11. Describe the characteristics of dough, cooked and uncooked. Take your dough and add different grains, e.g. blue cornmeal, oatmeal, whole wheat, rice flour, powder milk and yellow cornmeal. This activity will show students how different grains affect the structure of the bread.

12. Talk about flour, where it comes from, how it is ground and how it was ground in early days. Discuss early technology with crude tools and implements and the technological difference between grinding methods.

13. Identify good health habits such as eating nutritional foods.



Third Grade Evaluation Activities

1. Illustrate fractional parts of their frybread. Give students a circle and have them divide it into fractional parts i.e. $^{1}/_{2}$, $^{1}/_{4}$, $^{1}/_{3}$, $^{1}/_{6}$ and $^{1}/_{8}$.
2. Using fractional parts, compare relationships between fractional sizes. Which is greater i.e. $^{1}/_{4}$ or $^{1}/_{6}$, $^{1}/_{2}$ or $^{1}/_{3}$, $^{1}/_{2}$ or $^{1}/_{6}$, $^{1}/_{8}$ or $^{1}/_{4}$?
3. Chart dough ball estimation and actual size of fry bread.
4. List the physical change you observe in making fry bread.
5. Describe the chemical change in making frybread.
6. Write a journal entry about the scientific information learned from this activity.

Second Grade Evaluation Activities

1. Discuss where flour comes from. Show examples of corn ground into flour (or use other locally available grains). Use a traditional grinding stone and discuss other milling processes. Then let the students grind enough corn to make a cup of flour. Weigh grain and flour.
2. Have students estimate the weight of a dough ball after mixing dry ingredients. Chart the estimates. Weigh the raw dough and record on the chart. Compare the two. Have students weigh the cooked dough. Measure the frybread using inches or centimeters.
3. Have students write a brief paragraph about or draw a picture of the frybread process.

First Grade Evaluation Activities

1. Shape dough into a circle. Talk about the circle. Then have students make different shapes (circle, rectangle, triangle, square). Talk about the shapes. Cut shapes into $^{1}/_{2}$, $^{1}/_{3}$ and $^{1}/_{4}$.
2. Estimate how many pieces of frybread the dough will make. Count to see how many actual pieces of frybread were made.
3. Count how many circles, rectangles, triangles or squares were made. Graph the number of shapes.
4. Classify frybread by size and graph.

Recipe for Native Frybread

4 cups white flour
1 tablespoon baking soda
1 teaspoon salt
warm water
lard or shortening

Procedure

1. Mix the flour, baking powder and salt together. Add 1 $^1/_2$ cups of warm water to dry ingredients. Knead until dough is soft and elastic and does not stick to bowl. (If necessary, add a little more warm water.)
2. Shape dough into balls the size of a small peach. Pat back and forth by hand until dough is about $^1/_2$ or $1/_4$ thick and round. Make a small hole in center of round.
3. Melt 1 cup lard or shortening in heavy frying pan. Carefully put the rounds into hot fat, one at a time. Brown on both sides. Drain on paper towel and serve hot.

Resources

Karasch, Barrie. *Native Harvests.* New York: Random House, 1979.

Tribal American Children's Center and Tribal American Consulting Corporation. *American Indian Life Environment: An Early Education Curriculum.* 1975, p. 214.

Callaway, Sydney and Gary Witherspoon. *Grandfather Stories of the Navajos.* Illustrated by Hoke Denetsosie and Clifford Beck, Jr. Phoenix: Navajo Curriculum Center Press, 1974.

Developed By

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My Ideas for Food Unit:

Lesson Plans/Schedule for Food Unit

Nursery Rhymes and Poems

Little Tommy Tucker
Sang for his supper:
What shall he eat?
White bread and butter.

How shall he cut it?
Without even a knife?
How shall he marry
Without even a wife?

Little Jack Horner
Sat in the corner,
Eating a Christmas pie;
He put in his thumb,
And pulled out a plum,
And said, What a good boy am I!

Little Miss Muffet
Sat on a tuffet,
Eating her curds and whey
There came a big spider
And sat down beside her
And frightened Miss Muffet away.

Mistress Mary, quite contrary
How does your garden grow?
With silver bells and cockle shells,
And pretty maids all in a row.

Jack Sprat could eat no fat
His wife could eat no lean,
And so between them both, you see,
They licked the platter clean.

Polly, put the kettle on
Polly, put the kettle on
Polly, put the kettle on
We'll all have tea.

The Queen of Hearts
She made some tarts,
All on a summer's day;
The Knave of Hearts
He stole the tarts,
And took them clean away.

Pease porridge hot,
Pease porridge cold,
Pease porridge in the pot
Nine days old.

Some like it hot,
Some like it cold,
Some like it in the pot
Nine days old.

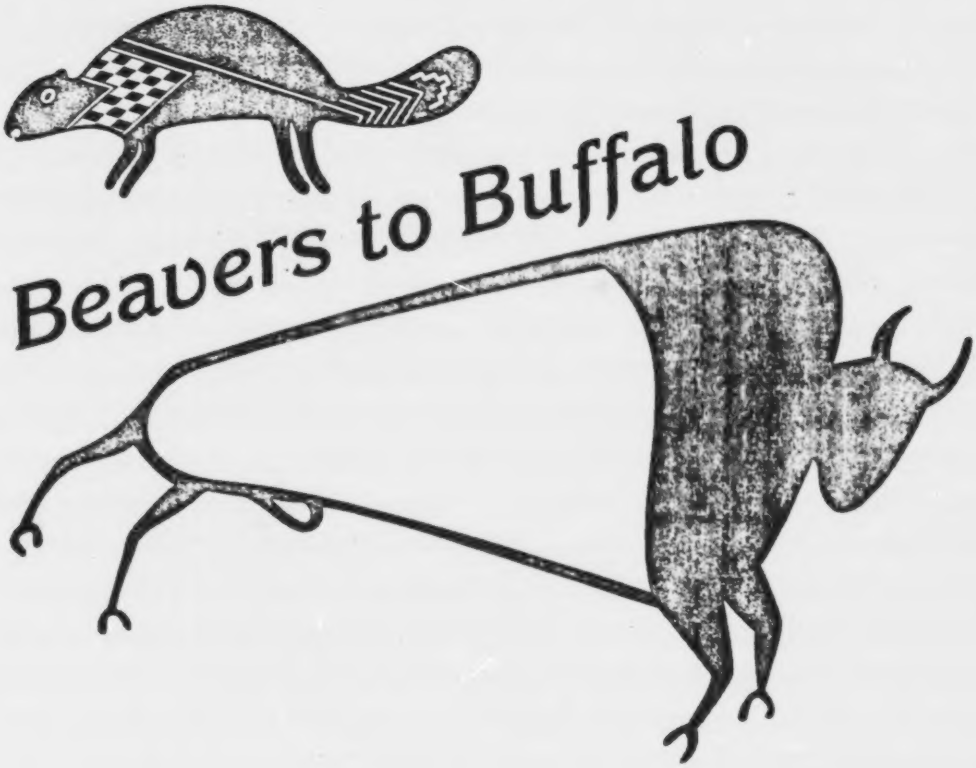
Yellow butterflies
Over the blossoming corn
With pollen-painted faces
Chase one another in brilliant throng.

Blue butterflies,
Over the blossoming beans,
Will pollen-painted faces
Chase one another in brilliant
streams.

Over the blossoming corn,
Wild bees hum;
Over the blossoming beans,
Wild bees hum.
– Southwest

Other food poems and songs

The teacher should have the students do choral readings of these selections, memorize and recite them, and explain what they mean in their own words. These can be used to stress phonemic awareness and beginning sounds/ending sounds, rhyming words in kindergarten and other word-attack principles such as sight words, long and short vowels, le, ing, er and r-controlled vowels in first grade and up.



Beavers to Buffalo

Background Information for Teachers and Parents

Phases 2 and 3

The Study of Animals in Science Lessons

– ORBIS Associates

In the study of animals in science lessons, teachers should emphasize animals from their local areas. The fact that Indian people respect animals and think of them as equals, or relatives, should be stressed. Indian people recognize the importance of animals and acknowledge their individual behavior characteristics. These are depicted in the many legends about animals in all tribal cultures. These legends should be included as part of the science curriculum.

Animals are important to Indians for food and clothing purposes and sometimes for shelter. Animal parts can be used for tools and utensils. Animal behavior is watched for such things as predicting weather.

Predicting Winter

If beavers build their dens more than four feet above the water level, the winter will be unusually cold.

If muskrats build their homes in the middle of the lake, there will be a long winter. A muskrat will build in deep water so there will be open water to make certain that he can get out if there is a long, hard freeze.

Clothing

Deer, moose, caribou, beaver and otter skins or pelts are used for clothing. Sometimes dyed moose or deer hair, as well as dyed porcupine quills, are used to embroider clothing.

Sinew and gut can be used as thread for binding; brain matter is used in the hide tanning process.

Tool/Utensils

A bear tooth set into a bone or wooden handle is used as a cutting or engraving tool.

Glues are made from the residue left from boiling deer antlers.

Hide scrapers are sometimes made from deer or moose jaws.

from *Science and Cultural Curricula*, Indian Education Act Resource and Evaluation Center One, ORBIS Associates, Washington, DC, 1986.

Background Information for Teachers and Parents

Phases 4 and 5 The Buffalo

In the early 1500's, there were millions of buffalo in this country. In fact, even two hundred years ago, there were still over 50 million. But then, the European-Americans started to move further west. Unlike the Plains Indians, these settlers were not really interested in respecting or honoring the buffalo. They killed them just for the hides without even eating the meat. Sometimes they just hunted them for the fun of hunting and didn't take any of the buffalo.

These European-Americans also started to disturb the buffalo's environment. Towns were built up everywhere; land was planted in crops instead of leaving it as prairies for the buffalo to graze on. The settlers also built railroads right through the prairies.

All of these activities resulted in the almost complete extinction of the once huge buffalo herds. By 1870, only about 13 million of the 50 million buffalo remained. But the most shocking time was between 1870 and 1900. In only 30 short years, the American buffalo herd dropped from 13 million to 1,000 animals! Fortunately, by 1900, people said "enough is enough. We've got to save the buffalo." Thanks to that effort, today there are an estimated 35,000 buffalo in this country.

For Indian tribes in the Plains area of the United States, the buffalo was truly a "Giver of Life." In other words, the Indians in that area depended on the buffalo for most of the important things they needed to live. In return for all that the buffalo gave the Indians, the Indians respected and honored them greatly through special ceremonies, dances and songs. Above all, the Plains tribes never hunted more buffalo than they needed and tried not to disturb the land that the buffalo depended on for its food.

When the Indian people killed a buffalo, they used every part of him. They did not waste any part. This respect for the buffalo and for the land he grazed on was very important. Without that respect the buffalo would not have been able to thrive, and then the whole way of life would be changed for the Plains Indians.

Before the Indians got horses, the Plains tribes followed the buffalo by foot. They used dogs to carry their goods. The horse changed the way that Plains tribes hunted buffalo. They could follow the migrating buffalo more easily. Until the middle of the last century, the lives of the Plains Indians were totally interwoven with the life of the migrating buffalo herds which provided a wonderful assortment of gifts for people to use including food, clothing, shelter, musical instruments, games, tools and weapons, cooking pots and carrying bags. You can certainly see now why the Plains Indians so greatly respected the buffalo.

– from *The World of Animals*, ORBIS Associates, Washington, DC.

Suggested Primary Level Unit Outline – Beavers to Buffalo

Reading, Language Arts, Science, Math, Art, Values	**Literature – Week 1**	**Literature – Week 2**
P Beavers to Buffalo Words H Reading Legends A Retelling/The Oral Tradition S Reading Nonfiction E Summarizing/Reporting Visiting Buffalo/Cost to Keep F Local Presenter on Buffalo I Protection of Habitat V Endangered Species/Numbers E Save the Earth/Animal Posters Being Good Stewards	Passing of the Buffalo in *Keepers of the Animals* by Caduto and Bruchac *The Return of the Buffaloes* by Paul Goble *There Still Are Buffalo* by Ann Nolan Clark	*Buffalo - American Bison Today* by Patent *Buffalo Days* by Diane Hoyt-Goldsmith *Brother Eagle, Sister Sky* by Susan Jeffers
P Beavers to Buffalo Words H Reading Nonfiction A Summarizing/Reporting S Reading Fiction E Responding/Retelling Visiting Buffalo/Cost of Meat F Buffalo Habits O Needs/Habitat U Drawing Buffalo R Having Courage	*Buffalo* by Emilie V. Lapthien *The Buffalo* by Sabrina Crewe *Bison for Kids* by T. Wilkinson	*The Buffalo Jump* by Peter Roop *Buffalo Hunt* by R. Freedman *Where the Buffaloes Begin* by Olaf Baker
P Beavers to Buffalo Words H Reading Fiction A Responding S Reading Legends E Retelling Mammals/Survey of Locale T Wolves, Coyotes, Foxes H Alike but Different R Needs/Habitat E Clay Animals E Don't Be Foolish	*Wolves for Kids* by T. Wolpert *Purple Coyote*/Cornette *Coyote at Pinon Place* by Deborah Dennard *Little Coyote Runs Away* by Craig Kee Strett *Way Out West Lives a Coyote Named Frank* by Jillian Lund	*Dream Wolf* by Paul Goble *Maii and Cousin Horned Toad* by Shonto Begay *Coyote and Little Turtle* by Hershal Talashoema *Coyote Goes Walking* by T. Pohrt *Coyote and the Laughing Butterflies* by H. Taylor
P Beavers to Buffalo Words H Reading Nonfiction A Summarizing/Reporting S Reading Legends E Retelling/Responding Mammals Baby/Adult Animals T Animal Tracks W Making Animal Masks O Respect for Animals/Life	*About Mammals: A Guide For Children* by Cathryn Sill *I Can Read About Baby Animals* by Elizabeth Warren *Little Friends* by Mike Logan *How to Be a Nature Detective* by Millicent E. Selsam	*The Great Race* by Paul Goble *I Sing for the Animals* by Paul Goble *How Turtle Set the Animals Free* by Jeanette Armstrong Gluscabi and the Game Animals in *Keepers of the Earth* by Caduto and Bruchac

Literature – Week 3	Literature – Week 4	Reading, Language Arts, Science, Math, Art, Values
Buffalo by F. Haines *Buffalo Land* by W. D. Berry *Bison - Symbol of the American West* by M. S. Sample	*White Buffalo Woman* by Christine Crowl *The Legend of the White Buffalo Woman* by Paul Goble *Buffalo Dreams* by Kim Doner The White Buffalo Calf Woman and the Sacred Pipe in *Keepers of the Earth* by Caduto and Bruchac	Beavers to Buffalo Words Reading Nonfiction Summarizing/Reporting Reading Legends Responding Comparing/Contrasting Listening to Elder's Present Where is a White Buffalo? Circle of Life Activity/Bruchac Respect Sacred Knowledge Wisdom, Generosity, Caring
People of the Buffalo by Maria Campbell *Gifts of the Buffalo Nation* by Intertribal Bison Cooperative *Time of the Bison* by A. Turner	*Buffalo Woman* by Paul Goble *Buffalo* by Tiffany Midge *The Great Buffalo Race: How the Buffalo Got Its Hump* by Barbara Ebensen	Beavers to Buffalo Words Reading Nonfiction Summarizing/Reporting Reading Legends Retelling/The Oral Tradition Indians' Use of Buffalo Based on Material Properties Presentation by Beadworker Student Beadwork Respect for Buffalo/Gifts
Antelope: Animals in the Wild by Mary Hoffman *The Deer* by Serge Simon *All About Deer* by Jim Arnosky *Forest* by Laura Godwin *Bambi* by Walt Disney *Once Upon a Springtime* by Jean Marzollo	*Antelope Woman* by Michael Lacapa *Echogee, the Little Blue Deer* by Acee Blue Eagle Awi Usdi, The Little Deer in *Keepers of the Earth* and How the Fawn Got Its Spots in *Keepers of the Animals* by Caduto and Bruchac *How the Baby Deer Got Its Spots* by Steven Roy	Beavers to Buffalo Words Reading Nonfiction Summarizing/Reporting Reading Fiction/Legends Responding/Retelling Animal Families Deer, Antelope, Elk Alike But Different Needs/Habitat/Camouflage Journey with Abenaki/Bruchac Care for Family
Peggy Porcupine, Roy Raccoon, and Billy Beaver all by Dave Sargent *Welcome to the World of Raccoons, Porcupines, Beavers* all by D. Swanson *Possum and the Peeper* by Anne Hunter *The Prairie Dog* by Sabrina Crewe	*Who Wants to Be a Prairie Dog?* and *Slim Butte Raccoon* by Ann Nolan Clark Turtle Races with Beaver and Why the Possum Has a Naked Tail in *Keepers of the Animals* by Caduto and Bruchac *I Can't Have Bannock But the Beaver Has a Dam* by Bernelda Wheeler	Beavers to Buffalo Words Reading Fiction/Legends Responding/Retelling Reading Nonfiction Summarizing/Reporting Two-Leggeds, Four Leggeds Local Small Mammals Alike But Different Make Sack Animal Puppets Animals Are Relatives

About the Literature for Phase Five

Indian people view animals as relatives and respect and care for them. Animals are the topic of many Indian stories. The buffalo is a very sacred animal.

Passing and Return of the Buffalo

Passing of the Buffalo in *Keepers of the Animals* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1997 **Kiowa**
The Return of the Buffaloes by Paul Goble, National Geographic Society, 1996. **Plains**
There Still Are Buffalo by Ann Nolan Clark, Ancient City Press, 1992. **Plains**
Buffalo – American Bison Today by Patent and Munoz.
Buffalo Days by Diane Hoyt-Goldsmith, Holiday House, 1997. **Crow**
Brother Eagle, Sister Sky by Susan Jeffers, Dial Books, 1991. **Northwest**
These books recount the care of buffalo today and the necessity of caring for Mother Earth to avoid the loss of things in nature.

The Importance of Buffalo

Buffalo by F. Haines.
Buffalo Land by W. D. Berry.
Bison – Symbol of the American West by M. S. Sample.
These books contain general information about buffalo. The information should be summarized and reported.

White Buffalo Woman by Christine Crowl, Tipi Press. **Lakota**
The Legend of the White Buffalo Woman by Paul Goble, National Geographic Society, 1998. **Lakota**
The White Buffalo Calf Woman and the Sacred Pipe in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1988. **Lakota**
Buffalo Dreams by Kim Doner
These selections tell the story of the gift of the sacred pipe to the Lakota people from the White Buffalo Calf Woman. The significance of the sacred pipe and the importance of the buffalo, and especially the white buffalo, should be covered with the children by someone recognized as knowledgeable of Indian spirituality if available. These versions of the story can be compared and contrasted. Include local stories of the buffalo.

About the Literature for Phase Four

Indian people view animals as relatives and respect and care for them. Animals are the topic of many Indian stories. The buffalo is a very sacred animal.

About Buffalo

Buffalo by Emilie V. Lapthien, Children's Press, 1989.
The Buffalo by Sabrina Crewe, 1997.
Bison for Kids by T. Wilkinson.
These selections contain information about buffalo, the history and present. The information can be summarized and reported.

Seeking and Hunting the Buffalo

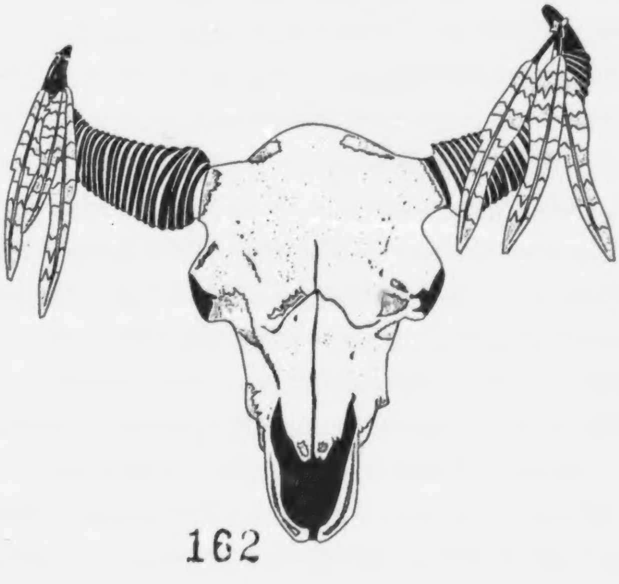
The Buffalo Jump by Peter Roop, Rising Moon, 1996. **Plains**
Buffalo Hunt by R. Freedman, Holiday House, 1998. **Plains**
Where the Buffaloes Begin by Olaf Baker, Puffin Books, 1981. **Blackfeet**
These selections are stories about seeking and hunting buffalo. They can be retold and responded to.

Gifts of the Buffalo

People of the Buffalo by Maria Campbell (**Indian Author**), Firefly Press, 1983. **Plains**
Gifts of the Buffalo Nation by the Intertribal Bison Cooperative, South Dakota. **Plains**
Time of the Bison by A. Turner, Macmillan, 1987.
These selections include various uses of parts of the buffalo and stresses the buffalo's importance to people. The information can be summarized and reported.

Buffalo Stories

Buffalo Woman by Paul Goble, Aladdin, 1984. **Plains**
Buffalo by Tiffany Midge (**Indian Author**), Scholastic Books. **Seneca, Omaha, Ojibwa, Wichita, Apache, Kiowa**
The Great Buffalo Race: How the Buffalo Got Its Hump by Barbara Ebensen, Little, Brown, 1994. **Seneca**
These materials are Indian legends about buffalo. They can be retold in the oral tradition. Include local stories of the buffalo.



About the Literature for Phase Three

Indian people view animals as relatives and respect and care for them. Animals are the topic of many Indian stories. Coyote is a trickster for many tribes.

Wolves

Wolves for Kids by T. Wolpert.
Dream Wolf by Paul Goble. **Plains**
These selections include nonfiction about wolves and an Indian legend including a wolf.

Coyote Stories

Purple Coyote by Cornette, Doubleday, 1999.
Coyote at Pinon Place by Deborah Dennard, Soundprints, 1999.
Little Coyote Runs Away by Craig Kee Strett, Putnam, 1997.
Way Out West Lives a Coyote Named Frank by Jillian Lund, Dutton, 1993.
These are fictional stories about coyotes. They can be retold and responded to.

Indian Coyote Stories

Maii and Cousin Horned Toad by Shonto Begay (**Indian Author**), Scholastic, 1992. **Navajo**
Coyote Goes Walking by T. Pohrt, Farrar Straus, 1995. **Plains**
Coyote and the Laughing Butterflies by Harriet Taylor, Simon & Schuster, 1995. **Pueblo**
These are Indian legends about the trickster, Coyote. They can be retold or performed.

Antelope

Antelope: Animals in the Wild by Mary Hoffman, 1987.
Antelope Woman by Michael Lacapa (**Indian Author**), Northland Pub., 1992. **Apache**
These selections include a nonfiction selection about antelope and an Apache legend.

Deer

The Deer by Serge Simon, Charlesbridge Pub., 1993.
All About Deer by Jim Arnosky, Scholastic, 1997.
Forest by Laura Godwin, 1998.
Bambi by Walt Disney, Mouse Works, 1996.
Once Upon a Springtime by Jean Marzollo, 1998.
These selections are about deer and fiction including deer.

Indian Deer Stories

Echogee, the Little Blue Deer by Acee Blue Eagle (**Indian Author**), Palmco, 1971.
Awdi Usdi, the Little Deer in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1988. **Cherokee**
How the Fawn Got Its Spots in *Keepers of the Animals* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1997. **Dakota**
How the Baby Deer Got Its Spots by Steven Roy, Tipi Press. **Dakota**
Include local stories about these animals.

About the Literature for Phase Two

Indian people view animals as relatives and respect and care for them. Animals are the topic of many Indian stories.

Mammal Animals

About Mammals: A Guide for Children by Cathryn Sill, Peachtree, 2000.
I Can Read About Baby Animals by Elizabeth Warren, 1996.
Little Friends by Mike Logan, Falcon Pub., 1992.
How to be a Nature Detective by Millicent E. Selsam, Harper Trophy, 1995.
These are general books about animals. The teacher should stress the mammals, especially ones that are from the area.

Indian Animal Stories

The Great Race by Paul Goble, Bradbury Press, 1985. **Plains**
I Sing for the Animals by Paul Goble. **Plains**
How Turtle Set the Animals Free by Jeanette Armstrong, (**Indian Author**), Theytus Books, **Okanagan**
Gluscabi and the Game Animals in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (Indian Author), Fulcrum Pub., 1988. **Abenaki**
These legends can be retold.

Some Mammals

Peggy Porcupine by Dave Sargent, 1996.
Roy Raccoon by Dave Sargent, 1996.
Billy Beaver by Dave Sargent, 1996.
Possum and the Peeper by Anne Hunter, Houghton Mifflin, 1998.
Welcome to the World of Porcupines by Diane Swanson, Whitecap Books, 1999.
Welcome to the World of Raccoons by Diane Swanson, Whitecap Books, 1998.
Welcome to the World of Beavers by Diane Swanson, Whitecap Books, 1999.
The Prairie Dog by Sabrina Crewe, 1996.
These selections include information about the animals and fiction stories.

Indian Stories About Mammals

Who Wants to Be A Prairie Dog? by Ann Nolan Clark, Haskell Indian Nations Foundation. **Navajo**
The Slim Butte Raccoon by Ann Nolan Clark, Haskell Indian Nations Foundation, **Lakota**
Why the Possum Has a Naked Tail, **Cherokee**, and Turtle Races with Beaver, **Seneca**, in *Keepers of the Animals* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1997.
I Can't Have Bannock But the Beaver Has a Dam by Bernelda Wheeler (**Indian Author**), Pemmican Pub.
These stories can be retold and responded to. Include local stories about little wild mammals.

Further Resources for Beavers to Buffalo Unit

These materials can be used to substitute for books in the suggested unit outline or for additional reading/other activities for students.

Raccoon's Adventures in Alphabet Town by Janet McDonnell, Children's Press, 1992.

The Furry Animal Alphabet Book by Jerry Pallotta, Charisma Press, 1990.

Plains Indians Coloring Book and Plains Indians Diorama available from Four Winds Books.

Northern Plains Indian Coloring Book by Charlene Peterson and Anna Rubia, Varia Pub., 1988.

A Coloring Book of **Hidatsa** Indian Stories compiled by Roberta Krim and Thomas Thompson, Minnesota Historical Society, 1988.

I Am a Little Deer by Francois Crozat, 1994.

Animals (Words for Everyday) by Zoe Davenport, 1995.

Desert Mammals, Grassland Mammals, Temperate Forest Mammals, Mountain Mammals, all by Elaine Landau, True Books, 1997.

Mammals by Joy Richardson, Franklin Watts, 1993.

The Animals Ballgame by L. Arneach, Children's Press, 1992. **Indian**

The Meeting of the Wild Animals in Favorite North American **Indian** Legends by Philip Smith, Dover.

The Two-Legged Creature by Anna Lee Walters (**Indian Author**), Northland Pub. **Otoe**

Coyote Becomes a Buffalo in **Lakota** and Dakota Animal Wisdom Stories by Mark W. McGinnis, Tipi Press, 1994.

The Secret of the White Buffalo by C. J. Taylor (**Indian Author**), **Lakota**

Buffalo Legend by Nancy Van Laan, Little, Brown, 1993. **Indian**

Spirit of the White Bison by B. Culleton (**Indian Author**), Peguis Pub., 1985. **Indian**

Ella Deloria's (**Indian Author**) The Buffalo People by Julian Rice, University of New Mexico Press, 1994.

Legend of the Crazy Horse Clan by Moses Nelson Big Crow (**Indian Author**). **Lakota**

White Tails Don't Live in the City by D. Bouchard, Whole Language Cons., 1989. **Indian**

The Legend of the Bluebonnet by Tomie DePaola, Putnam, 1983. **Comanche**

Ceremony in the Circle of Life by Whitedeer of Autumn (**Indian Author**).

The Indian Way by Gary McLain (**Indian Author**).

Between Sacred Mountains: **Navajo** Stories and Lessons from the Land, University of Arizona Press.

Champion of the Classroom in Earth's Caretakers, University of Kansas, 1994. **Arikara**

A Walk to the Great Mystery by Virginia Stroud (**Indian Author**), Dial Books for Young Readers.

Bear by E. K. Caldwell (**Indian Author**), Scholastic Books. **Indian**

Alaska Bear Tales by Larry Fanin.

The Year of the Three Legged Deer by E. Clifford, Dell, 1972. **Indian**

Sad Eyes in Our Father Story Teller by Pablita Velarde (**Indian Author**), Clear Light Pub., 1989. **Pueblo**

The Deer in the Wood, Adapted from Little House Book by Laura Ingalls Wilder, Harpercollins, 1995.

Wolf Run by J. Houston, Harcourt Brace, 1971. **Northwest**

Wolf Child by D. Nolan, Macmillan, 1989. **Indian**

Wolf Tales by Mary Powell. **Indian**

Brother Wolf by Harriet Peck Taylor. **Seneca**

Watchful Wolves by Ruth Berman, 1997.

Wolves in Just Listen, Houghton Mifflin Reading Series.

How Turtle's Back was Cracked by Gayle Ross (**Indian Author**), **Cherokee**

The Friendly Wolf by Paul Goble, Bradbury, 1974. **Plains**

Fox Song by Joseph Bruchac (**Indian Author**), Philomel.

Silver Fox and Coyote Create Earth, **Miwok**, How the People Hunted the Moose, **Cree**, and Why Coyote Has Yellow Eyes, **Hopi**, in Keepers of the Animals by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1997.

How Fox Brought the Forests from the Sky, **Snoqualmie**, and the Buffalo Bull and the Cedar Tree, **Osage**, in Keepers of Life by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum Pub., 1998.

Coyote, A Trickster Tale by Gerald McDermott, **Southwest**

Coyote and Bobcat by S. Harold Collins, Garlic Press, 1999. **Indian**

Coyote and the Grasshoppers by Gloria Dominic, Troll. **Pomo**

Coyote Stories and Why Bears Have Short Tails in And It Still Is That Way by Byrd Baylor, Trails West, 1976. **Included in some basal readers**

Navajo Coyote Tales by William Morgan, Ancient City Press, 1988

Navajo Coyote Tales by Berard Haile, University of Nebraska Press, 1984.

Emma and the Coyote by Margaret Ruurs, Stoddart Kids, 1999.

We Walk in Sandy Places by Byrd Baylor, Scribner, 1976. **Southwest**

Raccoon at Clear Creek Road by Carolyn B. Otto, Smithsonian, 1995.

Opossum at Sycamore Road by Sally Walker, Soundprints, 1997.

The Crayfish and the Raccoon and The Old Beaver Woman and the Eagle in **Lakota** and Dakota Animal Wisdom Stories by Mark W. McGinnis, Tipi Press, 1994.

Coyote and Porcupine in **Hopi** Coyote Tales by Ekkehart Malotki (Indian Author), University of Nebraska Press, 1984.

How the Toad and Porcupine Lost Their Noses in Favorite North American **Indian** Legends by Philip Smith, Dover.

Ben and the Porcupine by Carol Carrick, Houghton Mifflin, 1985.

Pine Ridge Porcupine by Ann Nolan Clark, Haskell Indian Nations University, **Lakota**

Beaver by Glen Rounds, Holiday House, 1999.

Amikoonse/Little Beaver by Ferguson Plain (Indian Author), Pemmican. **Ojibwa**

Otter Boy by Thomas E. Simms, Sinte Gleska University, 1989. **Lakota**

Prairie Dogs by Emery Bernhard, Harcourt Brace, 1997.

How Chipmunk Got His Stripes by Joseph and James Bruchac (**Indian Authors**), **Seneca**

Enuk, My Son by Claire Fejes, Pantheon, 1969. **Inuit**

Full Moon Stories by Eagle Walking Turtle (**Indian Author**), Hyperion, 1997.

Rudolph the Red Nosed Reindeer by Rick Bunsen, Golden Books, 1998.

The Christmas Deer by April Wilson, 1995.

Circle of Wonder, A Native American Christmas Story by N. Scott Momaday (**Indian Author**).

CHECK YOUR LIBRARY OR BOOKSTORES FOR OTHER BOOKS RELATING TO THE TOPIC.

Books in italics are especially suitable for Phase One – for preschool children.

BEAVERS TO BUFFALO WORDS

BEGINNING SOUNDS

- beaver
- beads
- beast
- baby
- bison
- bones
- bow
- bobcat
- buffalo
- buck
- bear
- berries
- bull
- badger

- hump
- hunt
- hide
- hoof
- hooves
- horn
- herd
- hair
- hunter
- horseback
- hibernate
- habitat

- pup
- pipe
- pouch
- paw
- pelt
- possum
- porcupine
- parfleche
- plains
- prairie dog

- camp
- coat
- cow
- calf
- cook
- caribou
- coyote
- claw
- clothing
- creek
- cougar

- sinew
- stampede
- spotted
- snort
- skin
- skunk
- skull
- squirrel
- scraper
- stream

- tail
- tan
- teeth
- tepee
- tipi
- trap
- tracks
- trickster
- two-leggeds

- fox
- fast
- feet
- food
- fur
- fawn
- family
- four-leggeds
- ferret

- run
- robe
- raccoon
- respect
- relatives
- rawhide
- reindeer
- rack

- meat
- moose
- milk
- mother
- moccasins
- mountain lion
- muskrat
- mink
- mountain goat

LONG VOWEL SOUNDS-i,o,e

- hide
- pipe
- white
- porcupine
- bone
- nose
- robe
- antelope
- coyote

- weasel
- beaver
- meat
- beast
- feast
- beads
- eat
- stream

Double O

- moose
- food
- raccoon

- hoof
- cook
- woodchuck

SHORT VOWEL SOUNDS-u,a,i

- pup
- run
- hunt
- hump
- jump
- cunning
- hunter
- skunk
- possum
- woodchuck
- chipmunk
- buffalo

- tan
- camp
- family
- raccoon
- animal
- antelope
- antler
- habitat
- tracks
- dam
- grass
- trap

- gift
- sinew
- skin
- trickster

OTHER WORDS

- quill
- kill
- leg
- shelter
- zoologist
- goat
- game

- elk
- ears
- endangered
- eyes
- water
- wolf
- groundhog

- deer
- dye
- opossum
- otter
- arrow
- bull boat

Word walls should be maintained. Instructors should ensure that students know the meanings of all of these words in this context and extend vocabulary by noting how they may mean other things in other contexts or they may have homophones. Experiences, pictures and student illustrations should be used to explain and process word meanings. Words that rhyme with these words can be examined to see varying spellings for sounds. Other words can be added. Teach the meaning of sayings such as “outfoxing someone,” to “weasel out,” and to “buffalo someone.”

Science Standards and Benchmarks for Beavers to Buffalo Unit

Standard – Understands that scientific inquiry works in particular ways
Benchmarks
Understands that learning can come from careful observations

Standard – Understands the main individual, social, ethical and institutional aspects of science
Benchmarks
Understands that learning can come from close observation of plants and animals, but they should not be mistreated

Standard – Understands the processes that shape the surface of the earth and the relation of the surface of the earth to the living environment
Benchmarks
Knows that change is something that happens to many things around us
Knows that living things respond to the conditions around them

Standard – Knows about the diversity and unity that characterize life
Benchmarks
Knows that some animals and plants are similar in appearance and behavior, and others are very different from one another
Knows that stories sometimes give plants and animals attributes they really do not have

Standard – Understands the genetic basis for the transfer of biological characteristics from one generation to another
Benchmarks
Knows that offspring grow up to be similar to their parents

Standard – Knows the general structure and functions of cells in organisms
Benchmarks
Knows that most plants and animals need air, food and water
Knows that plants and animals are composed of different parts, serving different purposes and contributing to the well-being of the whole organism

Standard – Understands how species depend on one another and on the environment for survival
Benchmarks
Knows that animals eat plants or other animals for food and may also use plants for shelter

Standard – Understands the cycling of matter and flow of energy through the living environment
Benchmarks
Knows that plants and animals both need water, animals need food to eat and plants need light

Standard – Understands the basic concepts of the evolution of species
Benchmarks
Knows that plants and animals have features that help them live in different environments

Standard – Understands the main steps in the transformation of a single fertilized cell into a fully-formed animal, and the process of the development and aging that follows birth
Benchmarks
Knows that animals have offspring, usually with two parents involved

Standard – Understands that the way things work often changes with scale
Benchmarks
Knows that many things in nature come in sizes and speeds that are very different – from very small to very large, very fast to very slow, etc.

Math Standards and Benchmarks for Beavers to Buffalo Unit

Standard – Effectively uses a variety of strategies within the problem solving process
Benchmarks
Brainstorms possible things to do
Draws pictures to represent problems
Represents problem situations using physical objects
Clarifies problems using discussions with teacher or knowledgeable others

Standard – Understands and applies basic and advanced properties of numbers
Benchmarks
Has a general understanding of the concept of number
Uses counting to exemplify numbers

Standard – Uses basic and advanced procedures while performing computation
Benchmarks
Adds, subtracts, multiplies, divides whole numbers with accuracy
Adds, subtracts, multiplies, divides decimals with accuracy

Standard – Understands and applies basic and advanced methods of measurement
Benchmarks
Understands the basic characteristics of weight and how it is measured

Standard – Understands and applies basic and advanced concepts of data analysis and distributions
Benchmarks
Has a basic understanding of the concept of data

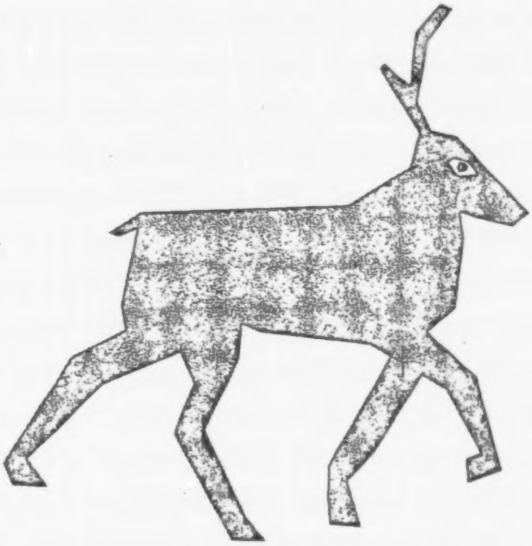
Language Arts Standards and Benchmarks for Beavers to Buffalo Unit

Standard – Gathers information effectively through reading, listening and viewing
Benchmarks
Provides an accurate retelling of the basic plot of simple stories the student has read, heard or viewed
Provides an accurate retelling of the main idea of simple expository information the student has read, heard or viewed
Understands that reading, viewing and listening are ways of gaining information about the world
Determines meaning of simple words from context
Creates mental representations for concrete information read, heard or viewed

Standard – Reads and responds to literature
Benchmarks
Understands that stories have beginning, middle and ending episodes
Understands the genre of legends and fables

Standard – Communicates ideas and information in writing
Benchmarks
Understands basic connections between spelling patterns and speech sounds
Understands basic phonological patterns in English
Expresses ideas in simple expository forms
Composes simple stories that express cohesive ideas

Standard – Understands and applies basic principles of language use
Benchmarks
Recognizes characteristic sounds and rhythms of language
Makes valid observations about the use of words



American Indian Content Standards for Beavers to Buffalo Unit

Science

Science as Inquiry –
Indian students should develop an awareness that observations and understandings of nature and ecological relationships traditionally formed an essential base of knowledge among American Indian cultures.

Physical Science –
Indian students should develop an understanding of the innate properties of objects and materials that were (and are) recognized by traditional American Indian cultures in the manufacture and use of specific tools and material objects that capitalize upon those properties.

Life Science –
Indian students should develop an understanding of plant and animal life cycles as exemplified in traditional American Indian concepts such as the Medicine Wheel.

Indian students should develop an understanding of characteristics of various animals as exemplified in traditional American Indian stories, legends, songs and dances.

Science in Personal and Social Perspectives –
Indian students should develop an understanding of elements of pre-contact North American environment and how changes to them were brought on by the arrival of Europeans in North America, such as the effects of the fur trade on animal populations and its subsequent effect on Indian life.

Indian students should develop an understanding of local challenges in environmental protection and how traditional Indian knowledge, practices and philosophies have been and continue to be called upon for solutions.

Mathematics

Mathematics as Problem Solving –
Indian students should formulate problems from everyday and mathematical situations within their home and tribal/community worlds.

Mathematics as Communication –
Indian students should relate their everyday language to mathematical language and symbols including expressing mathematical concepts in their Native languages.

Estimation –
Indian students should explore estimation strategies through activities derived from their cultural worlds such as estimating the number of sheep/horses that fit in a pen/corral.

Fractions and Decimals –
Indian students should apply fractions and decimals by applying them to real world situations using Native cultural experiences.

Language and Literacy

Indian students should be able to –

Listen for meaning and gain information from spoken English and a Native language.

Listen to Indian stories told in the oral tradition, comprehend their teachings and be able to retell them.

Speak coherently, conveying ideas in both English and a Native language.

Read fluently and independently, a variety of materials including those with American Indian themes.

Locate and use a variety of texts to gain information, for example, historical materials about their tribe, tribal legends and stories and oral history transcription.

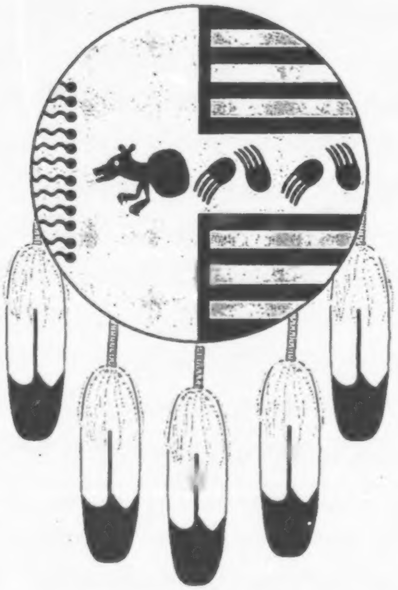
Be familiar with children's literature with Indian themes, especially with that pertaining to the student's tribe and literature written by Indian authors.

American Indian Content Standards, ORBIS Associates for Office of Indian Education Programs, Bureau of Indian Affairs, United States Department of the Interior, 1996.

Example Activities Developed by Teachers of American Indian Students

Workshop on Culturally-Based Math and Science Curriculum Development

Haskell Indian Nations University
1992 & 1993



Ideas included should be adapted for appropriateness.

SCIENCE

Animals on the Reservation

Cultural Objective

Students will understand that nature and animals play important roles in the lives of Native Americans.

Science Objective

Students will be able to tell about growth in plants and animals.

Teacher Background Information

Animals have great spiritual significance to Native Americans, as well as serving as sources of clothing and food. In the winter, the elders of the family sit around and tell stories about animals and their roles in creation, seasons, ceremonies, and other celebrations.

A Cherokee Indian legend, "Awi Usdi, the Little Deer," reminds us that, "Many years ago the humans and animals could talk to each other. They lived in peace and harmony, and the humans respected the animals. The humans killed the animals only when they were needed for food or clothing." But Little Deer crippled all the humans who did not "show respect and give thanks to the animals they hunted."

The Sioux (Lakota, Dakota) respect the buffalo for its food and clothing. It is considered to be a special gift from the Great Spirit sent to serve and help people. Native people use many types of animals for food and clothing, such as wool from goats and sheep, feathers from birds, and the hides of animals. Nature's bounty is not wasted. The Papago (Tohono O'odham) capture the coyote for its pelt and rabbits for their meat. Horses and cattle are raised by many tribes for food and clothing. These include the Papago, Navajo and Plains tribes. Sheep and goats serve the same purpose to the Navajos. Fish is also an important form of wildlife to the tribes near water areas, but fish is taboo for the Apache, Navajo and Zuni tribes.

Student Learning Activities

1. Discuss sheep while showing pictures, paying careful attention to the care necessary to raise sheep and their use. Put styrofoam, pipe cleaners, and cotton or cotton balls on the art table and have the children connect the styrofoam balls with pipe cleaners, and then use pipe cleaners for legs and facial features. Glue cotton on the sheep. Read a story about sheep or have the children make a group story or song from their own experience.
2. Show pictures of animals: horse, cow, rabbit, goat, cat, elephant, mouse, dog, deer, chicken, duck, lion, turtle and pig. Talk about how each animal moves and have the students take turns imitating animals for their classmates, asking them to guess what they are. Have the students draw or paint pictures of animals they see on the reservation.
3. Encourage students to tell their own animal stories.
4. Read to the children, *Buffalo Woman*, written and illustrated by Paul Goble. Talk about the uses of the buffalo. Show a picture of the buffalo and go over the simpler uses of the horns, bones, skin, hide and hair. Use popsicle sticks to represent buffalo ribs to make a toboggan. Use yarn to represent rawhide to tie it together. Use a brown paper bag for a vest: cut it to make a vest for little boys or a dress for little girls. The students will decorate it with crayons, paper, markers or paint.
5. Discuss the winter count. This is a calendar the Sioux used to count the years by winters. Pictures represent events of the year. Using brown wrapping paper, let the students make their own "winter count" of their lives. Use symbols to represent their interests, family or home.
6. Take the students to a farm, ranch or zoo to see buffalo.
7. Take students on a field trip to a zoo on the reservation. The teacher will discuss the information supplied by the zoo, so that the students will know what to look for as they go from display to caged areas.
8. Invite an elder to come into the classroom during the winter to tell winter stories about the coyote, dog and other animals.

Evaluation

The students will compile a book about the sheep, goats, buffalo or other reservation animals. They will write the words, draw and color pictures and design a cover.

Resources

Castletter, Edward F. and Ruth M. Underhill. *The Ethnobiology of the Papago Indians.* Albuquerque, New Mexico: University of New Mexico Press, 1978.

Science. Chicago: Harcourt, Brace, Jovanovich, 1985.

Gridley, Marion E., *The Story of the Sioux.* New York: Putnam's Sons, 1972.

Goble, Paul, *Buffalo Woman.* New York: Broadway Press, 1984.

Hall, Teresa, David Churchman, Sandy Gibbs, Kathleen Gebauer, John Quinlan, *American Indian Life Environments.* Tribal American Children's Center, 1975.

Minor, Marz and Nono, *The American Indian Craft Book.* Lincoln, Nebraska: University of Nebraska Press, 1972.

Developed By

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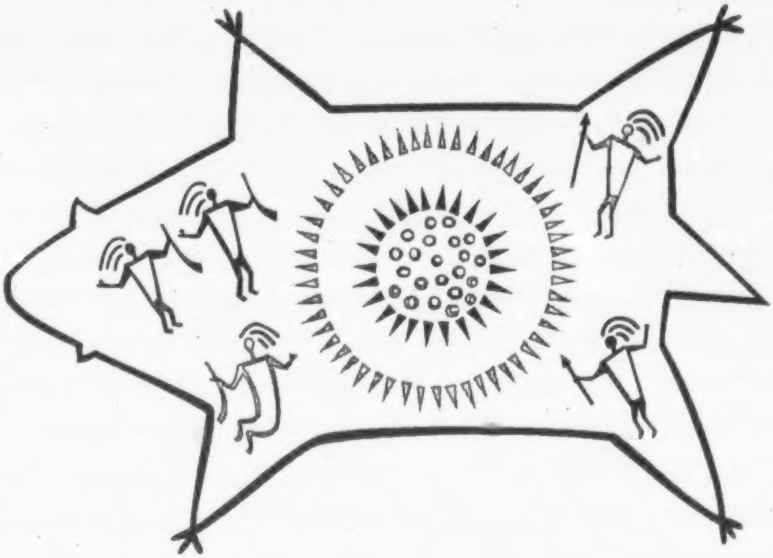
Mary Stonehouse



MATH AND SCIENCE

Wild Animal Math

Cultural Objectives

Students will:

understand Native American beliefs in regard to care of animals and nature

be able to identify the importance and many uses of animals in tribal life.

Math Objectives

Students will:

make generalizations and predictions by determining the rules on a given pattern

measure lengths using nonstandard units, centimeters and inches

make comparisons and predictions about pictures and bar graphs.

Teacher Background Information

To the Native American, animals of the wild were never hunted down as a sport. Instead, the animals were hunted to provide food, dress and shelter but usually only after an offering and prayer were given to ask for permission to hunt the animals.

The Native American considered the animals to be their relatives. Many clan names are derived from various animals. Some believed that divine beings were in animal forms. And today there are still ceremonial dances in which the dancers dress to resemble different animals.

This lesson uses a Cheyenne and Sioux Myth, *The Great Race of the Birds and Animals*, to illustrate the way in which mankind won power and guardianship over all animals. Man is reminded to use his power wisely, to take care of the animals, and to give thanks for them.

Student Learning Activities

1. Read *The Great Race of the Birds and Animals*. After the story, ask the following questions, then write student responses on butcher paper to post in the room:
    a. Why were Buffalo and People racing?
    b. Why did the birds take People's side and the animals Buffalo's side?
    c. How and why was Magpie important to the race?
    d. What was the prize?
    e. How is the advice, "Use your power wisely. Look after all things that I have made, even the smallest of them. They are all your relatives," still true today? How should we treat animals?
    f. How do we use animals today?

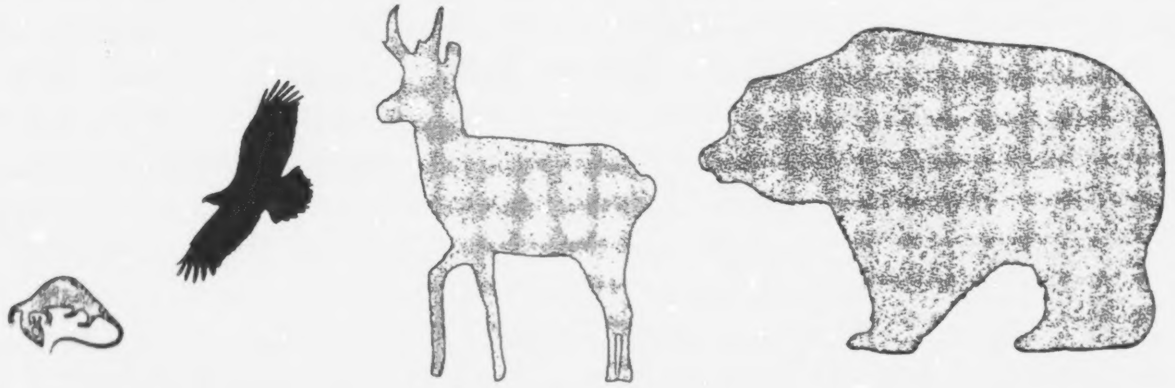
2. List and count the number of animals mentioned in the story.

3. Use the above list to put the animals in order according to their size.

4. Use a flannel board and flannel animals shapes from the story to develop math patterns in which the students will discover what comes next. Do several together.

5. Have students work in pairs to develop math patterns using animal shapes. Each pair will need various animals and several copies of each animal. Students will take turns in developing and solving the patterns.

6. Make an animal pictograph to solve problems.



Deer Pictograph

There are more than 60 different types of deer. The Whitetail deer is the most common deer and is also one of the smallest deer. It may stand 3 1/2 feet tall. Moose are the largest deer. They may be as tall as 7 1/2 feet tall.

Read the pictograph below and answer the questions about deer height.

Height	🦌 = 10 deer
3 feet	🦌 🦌 🦌 🦌
4 feet	🦌 🦌 🦌 🦌 🦌 🦌
5 feet	🦌 🦌
6 feet	🦌 🦌 🦌 🦌 🦌
7 feet	🦌 🦌 🦌

1. How many deer are 5 feet tall?
2. How many deer are 3 feet tall?
3. How many deer are taller than 5 feet altogether?
4. How many deer are shorter than 5 feet altogether?
5. How many deer are there all together?

6. Divide students into several groups. Have each group draw a life size animal on butcher paper that has been folded in half. Have students draw young animals (e.g. buffalo calf, lamb, fawn or coyote pup). Cut out two shapes of each animal. Staple together, leaving several openings to stuff the animals later. Paint and let dry. Stuff the animals with scraps of paper and then staple the openings closed. This activity will take several class periods.

7. Have each group estimate how tall or long they believe their animal is. Record the estimates on a chart. Have students measure the height and length of their animals using paper clips, and then with a ruler. Record each of these measurements on the chart. Discuss and compare the measurements on the chart. Story problems could also be developed from the charts.

Evaluation

1. Discussion questions after the story.
2. Have students write a paper on why animals are important to us and how they can help take care of the animals.
3. Small group work on patterns.
4. Measurement charts.

Resources

Goble, Paul. *The Great Race of the Birds and Animals.* New York: Aladdin Books, Macmillan Publishing Co., 1991.

Hoven, Leigh. *Thematic Unit – Native Americans.* Huntington Beach, California: Teacher Created Materials, 1990.

Wesche, Alice. *Wild Brothers of the Indians.* Tucson, Arizona: Treasure Chest Publications, 1977.

World Book Encyclopedia. Book "D", vol. 5, page 88. Chicago: World Book, 1989.

Developed By

Cynthia Henley

MATH AND SCIENCE

Endangered Species – The Buffalo

Time Frame: 2 Weeks

Cultural Objective

Students will:

appreciate and respect all living things in nature and recognize that man, animals and plants are one in the circle of life.

Science Objective

Students will:

recognize the relationship between earth, animal and plants, and how they interact to generate life.

Mathematics Objective

Students will:

select and use the correct operations with whole numbers

use charts and graphs to present and solve a problem

identify points, lines and line segments.

Teacher Background Material

Native Americans' relationship to Mother Earth has always been deeply rooted in their spiritual beliefs that everything in nature is one and man is part of this circle of life.

In many Native beliefs, the extinction of many forms of wildlife is an indication of the disharmony between man and nature.

The near annihilation of the American bison/buffalo by the European hunters and the US Army was a means to control the Plains Indians. The Plains Indians depended on the buffalo for their survival. The army predicted if all of the buffalo are killed, the Plains Indians will also be eliminated as the obstacle to the westward expansion. Some fair minded Texans requested the depletion of the bison be halted, but General Sheridan ordered continued extermination. By 1900 the American bison was near extinction from a population of 50 to 60 million only a century before. The protection of the American bison finally began in 1893. Through protective management, the buffalo has multiplied and is no longer on the endangered species list.

Student Learning Activities

1. Read *Buffalo Woman* by Paul Goble. Discuss with the students the relationship the Native Americans had with the buffalo. Record student responses on chart paper.

2. Display illustrations of animals most students are familiar with, i.e. horse, sheep, cattle, salmon, seals, etc. Have each student list why the animal she/he selected is important to her/him, family and tribe.

3. In 1993 the following numbers of buffalo existed.

Yellowstone	Canada	Reservations	Ranches
3,000	15,000	5,000	120,000

Students will develop a bar graph of the present numbers of buffalo.
What conclusions can the students make?
List the findings and conclusions on the chalkboard.

Evaluations

Students will draw pictures depicting how the buffalo was useful to the Native Americans. Share illustration with class.

Students will list ways how the family or community will be affected if the animal of their choice became extinct.

Assess students' understanding by observing their bar graphs and from the conclusions drawn.

Students will complete any of one or more of the activities listed below.

- ✔ Class participation in learning activities
- ✔ Record statements, comments, ideas and questions appropriate to lesson in the learning log
- ✔ Maintain a portfolio of notes, drawings and completed assignments

Materials

Story *Buffalo Woman*, drawing paper, pencils, markers, crayons, chart paper, learning log, portfolio, animal illustrations, dictionaries.

SCIENCE/MATH

Destruction of Habitat

Teacher Background Information

The extinction rate is higher now than when dinosaurs roamed the earth. The number and complexity of factors affecting the disappearance of species has continually increased. Human overpopulation, deforestation and pollution all contribute to the destruction of global wildlife habitats.

The destruction of global wildlife habitats threatens humans as well. The current threats to our environment can be controlled, or even reversed, if everyone becomes educated and in turn educates someone else about the threat to our Mother Earth.

Student Learning Activities

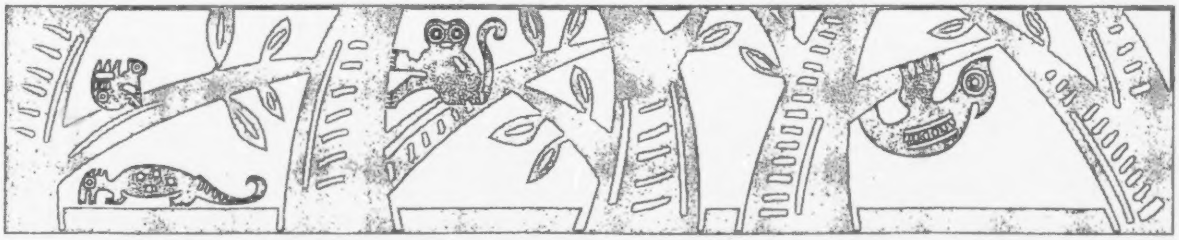
1. Discuss with students the effects of overpopulation, deforestation and pollution. Record responses on the butcher paper.
2. Students will discuss how they can help stop the destruction of the wildlife habitat and record their responses.
3. Students will discuss the relationship of man, animal and plants and how they interact to make new life. Record responses.

Evaluation

Students will illustrate, as groups or individually, how man, animals and plants can help each other to stay alive and make more of its kind. They can use the responses from discussions. Share illustrations and thoughts.

In discussion, have the students respond to the following:

> What have you learned about Endangered Species?
>
> What do we mean when we say, "Man, animals and plants are one in the circle of life?"



SCIENCE/MATH

The Role of Zoos

Teacher Background Information

A role of the zoo in protecting endangered species extends beyond entertaining customers to conservation and education efforts. They balance conservation programs with popular exhibits.

One controversial issue is "should zoos breed two of the same species with different characteristics and traits to create a hybrid?" Many argue this type of breeding creates an inferior species.

Student Learning Activities

1. Students will write the local zoo and inquire about their captive breeding program.

2. Students will write local/state/federal agencies and inquire about their recovery plan and breeding program to increase populations, particularly among endangered species.

3. Students will prepare playing cards using 3" x 5" tag board. On cards identified as Set A, students will list natural factors that decrease or increase animal population.

   The cards with natural factors which increase population will have plus values and cards with natural factors that decrease population will have negative values.

   Prepare cards identified as Set B. List human factors that impact directly or indirectly on the decrease of a population. These cards will have negative values.

   Fill a small container with 150 beans. This represents the animal population. Fill a separate dish with 100 beans to draw from to increase the population.

   Students will take turns drawing cards, reading and adding or subtracting from the pot.

   When all the cards are read, count the beans left in the population.

   How many beans are left in the population?
   Has the population increased or decreased?
   Has the population stayed the same?
   Why?

Evaluation

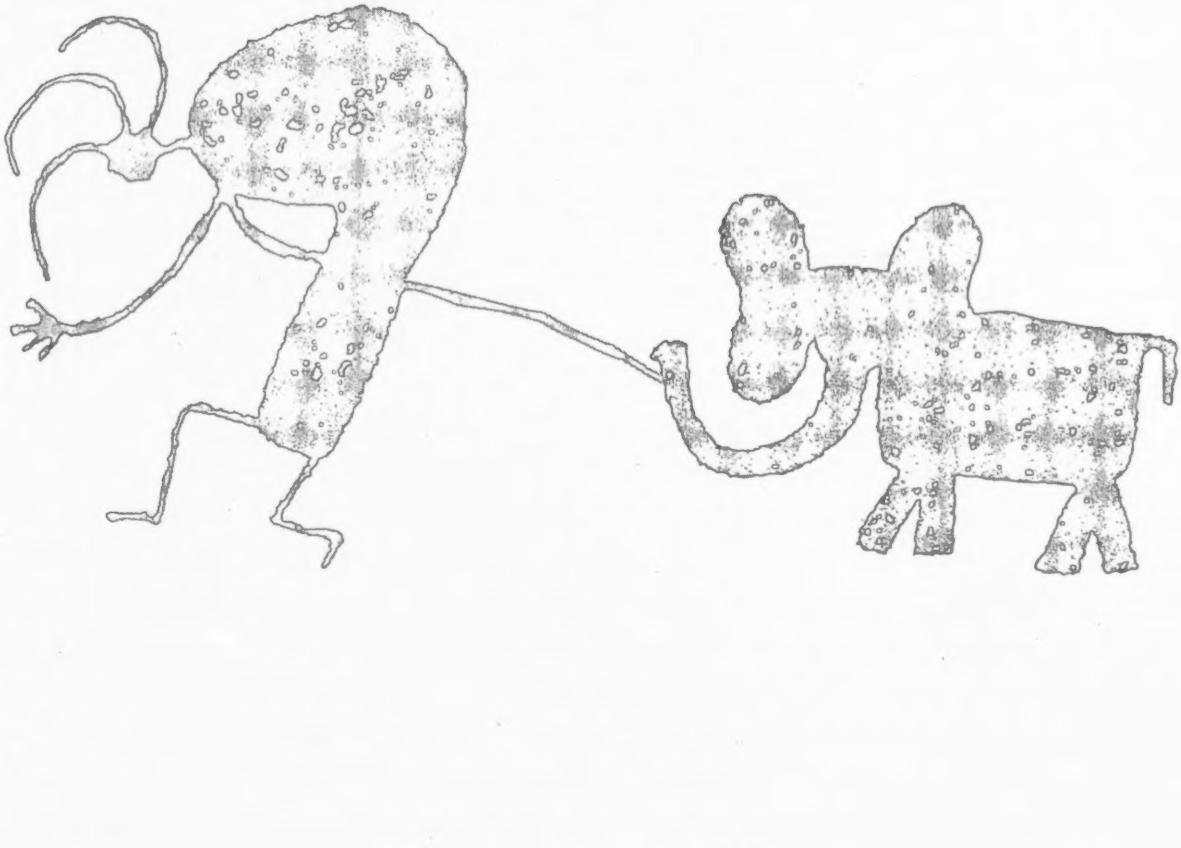
Students will complete 2 or more of the activities listed:

Class participation
Record in learning log
Maintaining a current portfolio

Cross-age teaching: Students will prepare a mini lesson on what they have learned and present it to a younger age student.

Materials

Envelopes, writing paper, addresses of the local zoo, federal or state wild life offices, tag boards, markers, beans, containers, calculators, learning log, portfolio, construction paper, completed activities for mini lesson.



MATH AND SCIENCE

Protecting Mother Earth

Cultural Objectives

Students will learn:

that Native Americans respect Mother Earth and treat her with reverence and sacredness.

that some people have become selfish and take from the earth but give nothing back in return. This behavior is an example of life out of balance.

Chief Seattle's statement, "Whatever befalls the earth befalls the sons of the earth. Man did not weave the web of life; he is merely a strand of it. Whatever he does to the web, he does to himself."

Math Objectives

Students will:

construct simple line or bar graphs, tables and charts

read and interpret a given set of information contained in a table, graph or chart.

Science Objective

Students will:

describe the role of plants in the prevention of erosion

know the importance of conserving natural resources

list the types of natural and man-made pollution, their causes and their impact on the environment

demonstrate knowledge of ethical and moral dilemmas associated with pollution by listing human causes of pollution and alternative choices

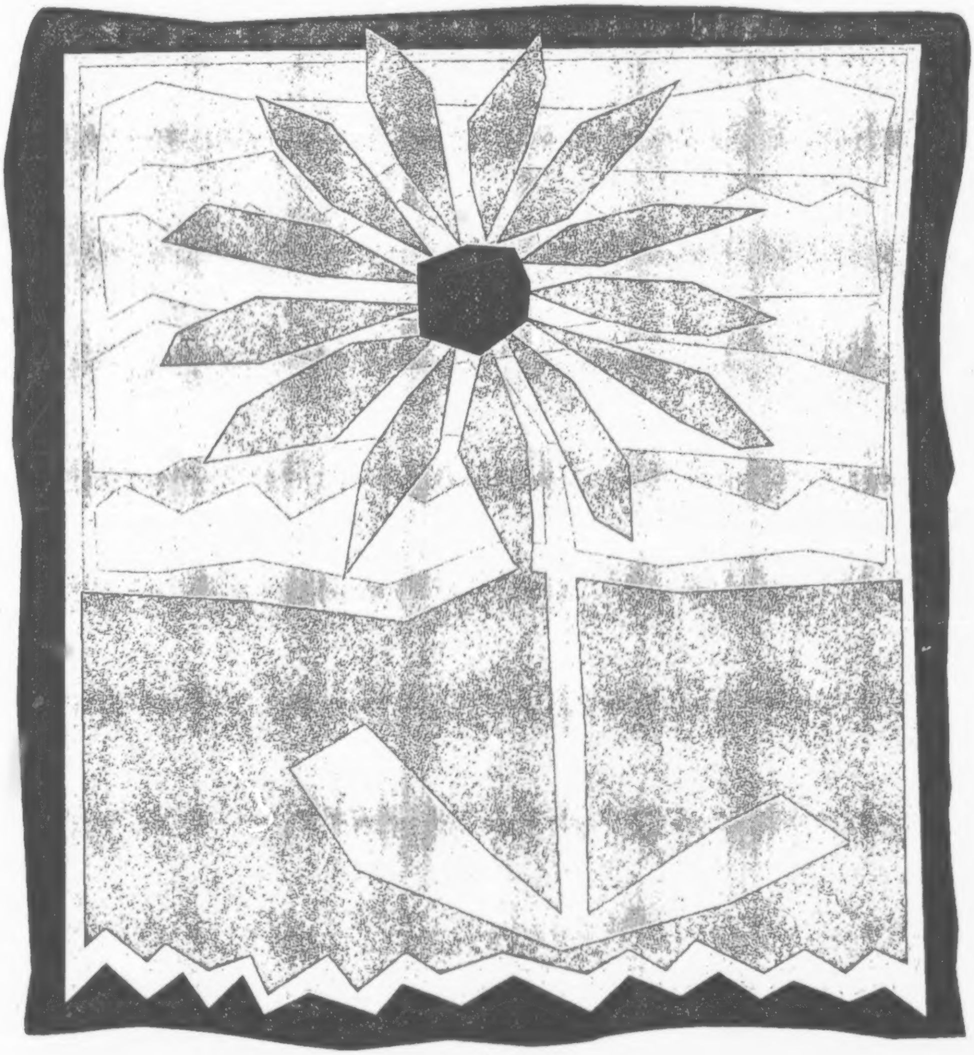
identify examples of destruction of habitats due to population growth and misuse of resources

understand cause and effect relationships.

Teacher Background Material

The Legend of the Bluebonnet by Tomie de Paola, is a very good introduction to the topic of ecology. In this Comanche legend, a little orphan girl unselfishly offers her most prized possession, her doll, to the Great Spirit. Because of her unselfishness, blue flowers could be seen in all directions and the rain began to fall. As a result, her tribe was saved.

Discuss the types of pollution, their causes, and the ways in which they can effect changes in their lives, families and communities. Explore creative ways of transforming "trash" into "treasure." As Buckminster Fuller often said, "There is no such thing as trash. There are only precious resources we haven't found a use for yet."



Student Learning Activities

1. Discuss doll-making techniques and materials.
   a. Invite a guest from the community to demonstrate and discuss doll-making techniques. Videotape the demonstration for later reference and to house in the library.
   b. Group students and give each group a doll made from different materials. On chart paper, have pupils list the materials they think their doll is made. Each group discusses the materials they had listed.
   c. Conduct an experiment on the juices from native berries that will show up on cloth and can be used for painting faces on the dolls.
2. Give students a doll-making assignment.
   a. Have pupils bring an item from home from members of their family e.g. buttons, trim, lace, etc.
   b. Gather wild grapes, cedar berries, cherries, etc. from your local area.
   c. In the classroom, wash and sort the berries and squeeze the juice into cups. Have students predict which juice will be best. Tally their predictions.
   d. Give small groups of students scraps of muslim, the different juices and paint brushes.
   e. Instruct student to write their names on the material with a pencil. Draw and label a mouth and two eyes using different juices for each part. Let dry overnight. Observe and record which juices showed up best. Display and compare the results.
   f. Have the class construct their dolls following the steps the resource person demonstrated. The items brought from home are used to design their dolls. The best juice, according to their test, is used to draw the dolls' faces.
   g. When the dolls have been completed, place them in a designated area and have pupils measure the heights of their dolls. Record and chart the heights to compare them with others.
   h. Invite the parents/guardians and the resource person to a fashion show of the finished dolls. If possible, videotape the show for later viewing by the pupils.

Doll Making Materials

- markers
- cherries
- water
- muslin scraps
- contributions from family members
- pencils
- cedar berries
- cups (1 per pupil)
- paper
- wild grapes
- small cans (1 per pupil)
- paint brushes
- rulers

3. Construct a Litter Man.
    a. Take a nature walk and note the litter found in the area. Discuss why littering is bad, the reasons why people throw trash out and what may happen if they continue to litter.
    b. Brainstorm for vocabulary words, write them on a chart and use in later creative writings.
    c. Contact the U.S. Forest Service and ask Woodsy Owl to visit the classroom to talk about pollution.
    d. Organize students in groups and assign a specific area of the playground for each group to collect trash from for a week.
    e. Provide each group of students with a rectangular dishpan, marked in fourths, with objects buried beneath sand or dirt. Each grid is labeled A, B, C or D. Students then carefully dig through the grid and record on a sheet of paper (divided into grids) any objects they may find. Each location should be labeled and the object drawn on the paper. Continue in this manner with the remaining grids.
    f. Students will chart trash collected daily from a specific area. They will map the area where they collect their trash. They will sort their trash and explain to the class how they classified their trash.
    g. Students will work in groups to set up a graph to show the amount of trash collected daily.
    h. Using a large piece of chicken wire, the students will shape a litter man, filling the holes in the wire with the litter which they have collected.

4. Using a map of the United States showing the territories of the Native American tribes prior to 1600, have students choose a representative tribe from the southeast, northeast, central plains, northwest and southwest e.g. the Seminole, Mohawk, Cheyenne, Kwakiutl and the Pueblo.
    a. Separate students into five groups and assign a tribe to each group.
    b. Groups will then research to discover how their tribe obtained food and clothing, what types of shelters they constructed and specific ways they adapted to their environment.

c. Each group will then guess reasons for the types of lifestyles which they discovered.

d. Each group will draw pictures illustrating the results of their research, mount them on a chart and make an oral presentation to the whole class.

e. When all presentations have been made, the whole group will compare and contrast the differences and similarities of each tribal lifestyle.

f. Each group will construct a diorama to authentically portray its tribe's lifestyle and environment. The group will construct a model of an item or illustrate a process specifically developed by the particular tribe to adapt to the respective environment.

g. Each group will investigate the folklore of the tribe which members studied to find a legend or poem that pertains to an element of nature e.g. the sun, winds, rains, etc. Members will illustrate the legend or poem and will present their legend or poem to the whole class. The whole class will chart the similarities and differences in these ancestral views of nature.

5. Investigate renewable and non-renewable resources.

   a. Ask students to identify objects that come from plants, animals and things of the earth. Record on paper. Cut pictures from magazines that show products made from plants, animals and natural resources. Work in small groups to make collages.

   b. Invite a resource person from a lumber yard. Ask the visitor to bring in different types of wood and discuss the amount of wood cut per year, as well as types of products that come from wood.

   c. Discuss what is renewable and non-renewable. Work on a definition for renewable and non-renewable resources.

   d. Repeat the search for products composed of renewable and non-renewable resources.

   e. Bring in a section of a tree trunk. Let children examine it and draw conclusions about it.

   f. Discuss how long it takes for a tree to grow. Research how many trees it would take to make the students' desks, paper, chairs, etc.

   g. Bring in clothing made from animal skins. Ask students to speculate about the number of animals it took to make the clothing.

   h. Invite a resource person from a local zoo to discuss why some animals are endangered or extinct.

   i. Bring a variety of clothing and food products made from plants. Have students infer that these items are renewable farm products.

   j. Invite a local farmer to discuss how farming has changed over the years.

k. Take the class to a local recycling facility.

6. Conduct a community recycling drive.
   a. Have students read books about the Earth and recycling with their parents/guardians. Discuss the need for community involvement in recycling in order to establish parental support for the drive.
   b. Consult local tribal leaders about the possibility of a contest between villages to see which one could collect the most materials for recycling.
   c. Design and construct posters to be posted in each village announcing the date of the village clean-up and recycling drive.
   d. Provide locations for trash to be brought for sorting and recycling pickup.
   e. Have students work with representatives from the Tribal Council and the recycling plants to establish a schedule for collections at the villages.
   f. Ways and types of measurement for the trash will have to be determined by the village officers and the pick-up crew.
   g. Have the students send information about the recycling drive to Renew America, an organization that collects stories about people who help create Earth-positive changes in their community.

Evaluation

Each activity contains its own built-in evaluations, such as discussions, construction of the doll, litter man, dioramas, charts and setting up the tribal recycling drive.

Resources

Beakes, Norris. *Our Wonderful World.* Fresno, California: Aims Education Foundation, 1987.

Brandon, William. *The Magic World.* New York: Morrow, 1971.

de Paola, Tomie. *The Legend of the Bluebonnet.* New York: G. P. Putnam's Sons, 1983.

Detwyler, Thomas. *Man's Impact on Environment.* New York: McGraw Hill, 1971.

Laury, Jean Ray. *Doll Making – A Creative Approach.* New York: Van Nostrand Reinhold Co., 1970.

Pringle, Laurence. *The Only Earth We Have.* New York: Macmillan, 1969.

Developed By

Renata Griego
Diane Cleveland
Elaine Hendricks

My Ideas for Beavers to Buffalo Unit:

Lesson Plans/Schedule for Beavers to Buffalo Unit

Nursery Rhymes and Poems

A Little Squirrel
I saw a little squirrel
Sitting in a tree;
He was eating a nut
And wouldn't look at me.

The Beaver
The beaver is fat,
and his tail is so flat
that it resembles an oar.
He's known for his teeth,
those on top and beneath,
and he lives just a trifle offshore.

He nibbles on trees
as a mouse nibbles cheese
with incisors as sharp as a knife.
And with dexterous tricks
builds a house out of sticks
along with his children and wife.

Far, far away from Buffalo Country
Hither now they come with their little ones
Rapidly now they walk, rapidly they walk,
Even now they reach the Red Bird Cap.

O Buffalo Old Man, O Buffalo Old Woman!
Come hither rapidly with your little ones.
– Pueblo

A Poem About a Wolf, Maybe Two Wolves
He comes running
Across the field where
He comes running
Yoweeeeeeeeeeeeeeeeeeeeeeeeeeeeeee

Other wild animal poems, songs.

The Porcupine
The porcupine is puzzled
that his friends should act so queer,
for though they come to visit him
they never come too near.

They often stop to say hello
and pass the time of day,
but still the closest of them all
stays many feet away.

He sits and ponders endlessly,
but never finds a clue
to why his close companions
act the distant way they do.

The porcupine has never had
the notion in his brain
that what he finds enjoyable
to others is a pain.

Buffalo Story
In this way came the buffalo tracks
the buffalo track that we see
that everywhere we see

the tracks of those feet made by life
in this way
life that came in this way

Now the little calf is born
filled with life and motion
born the newborn yellow calf
standing on its feet and walks
leaving tracks, leaving tracks
– Omaha

The teacher should have the students do choral readings of these selections, memorize and recite them, and explain what they mean in their own words. These can be used to stress phonemic awareness and beginning/ending sounds, rhyming words in kindergarten and other word-attack principles such as long and short vowels, ly, le, er and ing, singular - plural, and other skills at the first grade level and up.

Additional Resources

Indian ABC Books

Many Nations: An Alphabet Book of Native America by Joseph Bruchac (Indian Author), Troll, 1998.

Cherokee ABC Coloring Book by Daniel Pennington, Book Publishing Co., PO Box 99, Summertown, TN 38483

ABC's of Our Spiritual Connection by Kim Soo Goodtrack (Indian Author), Theytus Books.

ABC's, the American Indian Way by Richard Red Hawk (Indian Author), SCB Distributors, 1992.

The Path of the Quiet Elk, A Native American Alphabet Book by Virginia Stroud (Indian Author), Dial, 1996.

Navajo ABC, A Dine Alphabet Book by Luci Tapahonso (Indian Author), Aladdin, 1999.

Powwow ABC by Sandy Hummingbird, 2000.

Where to Get Books

North American Native Authors Catalog, Greenfield Review Press, PO Box 308, Greenfield Center, NY 12833 * 518/583-1440

Medicine Root Inc., Native Earth Products of North America, PO Box 353, Louisville, CO 80027 * 303/661-9819

Indian Books Catalog, Four Winds Indian Books, PO Box 544, York, NE 68467-0544 * 402/362-5654 * www.fourwindsindianbooks.com

Oyate Catalog, 2702 Mathews St., Berkely, CA 94712 * 510/848-6700 * www.oyate.org

Prairie Edge Book and Music List, Prairie Edge, 6th & Main, Rapid City, SD 57701 * 800/541-2388 * prairie@rapidnet.com * www.prairieedge.com

Native American Catalog, Book Publishing Company, PO Box 99, Summertown, TN 38483 * 931/964-3571 * bookpubl@usit.net

Pemmican Pub., Unit #2, 1635 Burrows Ave., Winnipeg, Manitoba R2X0T1 Canada 204/589-6346 * pemmican@fox.nstn.ca

Books Available from the Haskell Foundation

Hen of Wahpeton by Ann Nolan Clark $8.00

Little Herder in Spring, Little Herder in Summer, Little Herder in Autumn, Little Herder in Winter by Ann Nolan Clark 4 books for $25.00 or 1 for $8.00

There Still Are Buffalo by Ann Nolan Clark $7.00

Coyote Tales by William Morgan $8.00

Who Wants To Be A Prairie Dog? by Ann Nolan Clark $7.00

Slim Butte Raccoon by Ann Nolan Clark $7.00

Young Hunter of Picuris by Ann Nolan Clark $6.00

Little Turtle by Hildegard Thompson $4.00

Little Hopi by Edward A. Kennard $8.00

Little Boy With Three Names by Ann Nolan Clark $8.00

Bringer of the Mystery Dog by Ann Nolan Clark $8.00

Billy Black Lamb by Caroline H. Breedlove $4.00

Field Mouse Goes To War by Edward A. Kennard $8.00

Grass Mountain Mouse by Ann Nolan Clark $8.00

Little Man's Family, Books One and Two $5.00 and $7.00

Navajo Life Series by Hildegard Thompson $4.00

Sun Journey by Ann Nolan Clark $7.00

This Little Books series of children's books was commissioned by the Bureau of Indian Affairs in the 30's, 40's and 50's. They have influenced and entertained several generations of Indian children.

To place an order for the Little Books, call 785/749-8417 or 8425. Shipping and handling extra. The Haskell Foundation, 155 Indian Avenue, Lawrence, KS 66046.

Science Organizations and Projects

American Indian Science and Engineering Society, PO Box 9828, Albuquerque, NM 87119-9828 Publishes Winds of Change Magazine 505/765-1052 * www.aises.org

Four Directions Project involves science, math and technology for Bureau of Indian Affairs funded schools. Pueblo of Laguna, Laguna, NM * www.4directions.org

Bureau of Indian Affairs Council Fire Website, Lightspan Partnership by Subscription www.lightspan.net

American Indian/Alaska Native Initiative, National Science Foundation Rural Systemic Initiative, Tribal Colleges, Alaska, Utah-Colorado-Arizona-New Mexico (UCAN), Navajo Nation projects, NSF, Arlington, VA * www.nsf.gov

Teacher Resources

Earth's Caretakers and Signs of Tradition: Native American Lessons, Math and Science Teachers for Reservation Schools (MASTERS) Project, University of Kansas, 1993 & 1994. 785/864-4435 * jnewland@ukans.edu

Keepers of the Earth, Keepers of the Animals, Keepers of Life, Keepers of the Night by Michael Caduto and Joseph Bruchac, Fulcrum Pub., Golden, CO 1988-1998.

Native Science, Natural Laws of Interdependence by Gregory Cajete, Clear Light Pub., 2000.

Ignite the Sparkle: A Native American Science Education Curriculum Model by Gregory Cajete, Kavaki Press, Skyland, NC 1999.

American Indian Science, A New Look at Old Cultures by Fern Brown, Twenty First Century Books, 1997.

Through Indian Eyes: The Native Experience in Books for Children by Doris Seale and Beverly Slapin, New Society Publishers, 1987. Oyate, 2702 Mathews St., Berkeley, CA 94702

Start Early, Finish Strong: How to Help Every Child Become a Reader, U.S. Department of Education, 1999. 877/4ED-PUBS * www.gov/pubs/edpubs.html * www.gov/americareads

Put Reading First, Research Building Blocks for Teaching Children to Read, K-3 www.nifl.gov

Social Studies Books for K-3

Families

On Mother's Lap by Ann Herbert Scott.

MaMa, Do You Love Me? by Barbara M. Joosse, Chronicle Books, 1991.

In My Mother's House by Ann Nolan Clark.

Grandmother's Dreamcatcher by Becky Ray McCain, Albert Whitman & Co., 1998.

Grandmother's Christmas Story by Richard Red Hawk (Indian Author).

Grandma Knows by Lois Dalby and Jeanette McCrie, Peguis Pub., 1972.

Songs from the Loom, A Navajo Girl Learns to Weave, We Are Still Here Series.

The Worry Stone by Marrianne Denger, Rising Moon, 1996.

Askii and His Grandfather by Margaret Garaway, Treasure Chest, 1989.

Alice Yazzie's Year by Ramona Maher, Coward, 1977.

Shemay, The Bird in the Sugar Bush by David Martinson (Indian Author), Duluth Indian Ed. Advisory Committee, 1975.

Morning Arrow by Nanabah Chee Dodge (Indian Author), Lothrop, 1975.

Shota and the Star Quilt by Margaret Bates-Hill, Gloria Runs Close to Lodge and Philomene Lakota (Indian Authors), Zero to Ten, Ltd., 1998.

Jingle Dancer by Cynthia Leitich Smith (Indian Author).

Where Did You Get Your Moccasins? by Bernelda Wheeler, Peguis Pub., 1992.

Kevin Cloud, Chippewa Boy in the City, Reilly & Lee, 1972.

American Indian Families by Jay Miller.

"The Family" in the Learning Circle, Classroom Activities on First Nations in Canada, Department of Indian Affairs and Native Development. www.inac.gc.ca

Little Man's Family, Haskell Foundation.

Children of Clay, A Family of Pueblo Potters, We Are Still Here Series.

Communities

Drumbeat, Heartbeat, A Celebration of the Powwow, We Are Still Here Series.

A Trip to a Powwow by Richard Red Hawk (Indian Author).

American Indian Festivals by Jay Miller.

Lakota Sioux Children and Elders Talk Together by E. Barrie Kavasch, Power Kid Press, 1999.

Powwow Activity Book by Sandy and Jesse Hummingbird.

Clambake, A Wampanoag Tradition, We Are Still Here Series.

The Spring Celebration by Tina Umpherville (Indian Author), Pemmican, 1997.

A Haida Potlatch by Ulli Steltzer, University of Washington, 1984.

Indian Nations

Native Peoples Series for Primary Grades available from Four Winds Indian Books. Includes Apache, Cherokee, Chinook, Chumash, Commanche, Iroquois, Miwok, Ojibwa, Pomo, Powhatan, Pueblo, Seminole, Sioux, Wampanoag, Inuit, Navajo, Pawnee, Nez Perce, Cheyenne, Shawnee, Shoshone, Choctaw.

New True Books About Native Americans Series, Children's Press. Includes Apache, Cherokee, Cheyenne, Chippewa, Choctaw, Chumash, Crow, Delaware, Eskimo, Hopi, Mandan, Menominee, Mohawk, Navajo, Nez Perce, Oneida, Onondaga, Pawnee, Penobscot, Pomo, Seminole, Seneca, Shoshoni, Sioux, Tlingit, Tuscarora.

History

Map of American Indian Tribes available from Four Winds Indian Books.

The People Shall Continue by Simon Ortiz (Indian Author), Children's Book Press, 1977.

The Trail of Tears by Joseph Bruchac (Indian Author).

The Unbreakable Code by Sara Hoagland Hunter.

The Story of Wounded Knee available from Four Winds Indian Books.

Before Columbus available from Four Winds Indian Books.

Unit Title

Introduction

Paragraph describing what the students will be learning and how it fits into the overall school curriculum.

Activities and Materials

List the major activities students will be engaged in. Be sure to list word study, reading, writing, speaking and listening activities as well as hands-on activities and viewing of visuals or demonstrations. Include the materials, especially books, stories and poems that will be used for the unit.

Standards and Benchmarks/Skills Addressed

List the state standards and benchmarks addressed by the activities in the unit. You can use the code numbers of the standards and benchmarks.

Evaluation

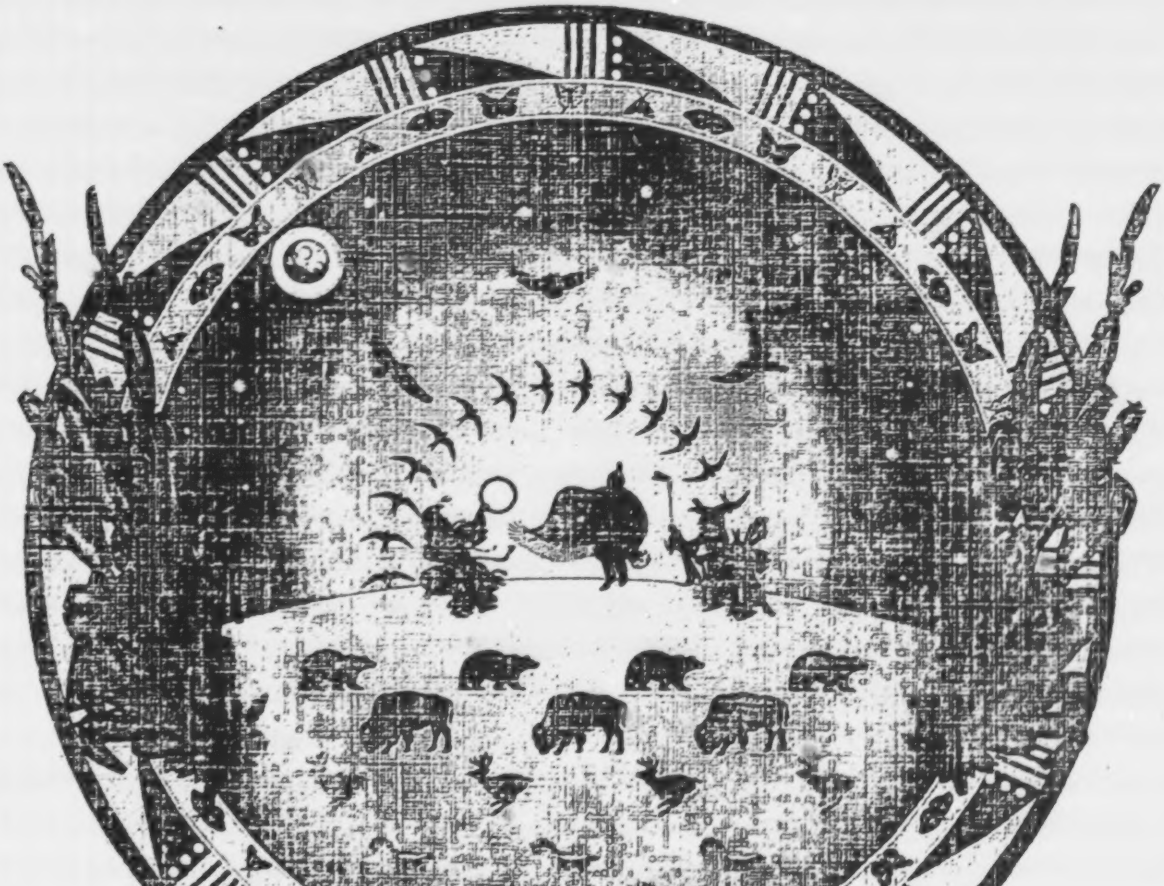
How you will know that students have learned what you want them to learn.

Approximate Length of Unit

Days or hours needed for the unit.

Creating a Sacred Place to Support Young American Indian and Other Learners in Grades K-3

Volume II



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by

Sandra J. Fox D.Ed.

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Creating a Sacred Place to Support Young American Indian and Other Learners in Grades K-3

Volume II

by

Sandra J. Fox D.Ed.

Materials & Activities for
Hares to Horses,
Art,
Earth, Air, Water & Fire,
Music & Dance
Units

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This book is dedicated to Rick Albers, Wambdi Kan Hoksida
(Old Eagle Boy),
(1950-2000)
who believed in creating a sacred place.

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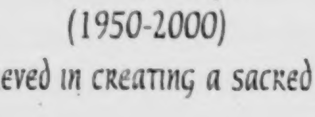

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Contents

Introduction i

Creating a Sacred Place – Administrators and School Board Members 1

Creating a Sacred Place – Parents and Tutors 3

Creating a Sacred Place – Teachers and Aides 5

Materials and Activities for Hares to Horses Unit 11
  Teacher's/Parent's Background Information 12
  Suggested Primary Level Unit Outline 14
  About the Literature 16
  Further Resources for Hares to Horses Unit 20
  Hares to Horses Words 23
  Science, Math and Language Arts Content Standards Addressed 24
  Activities Developed by Teachers of Indian Students 29
  My Ideas for Hares to Horses Unit 47
  Lesson Plans/Schedule for Hares to Horses Unit 48

Materials and Activities for Art Unit 51
  Teacher's/Parent's Background Information 52
  Suggested Primary Level Unit Outline 54
  About the Literature 56
  Further Resources for Art Unit 60
  Art Words 63
  Science and Language Arts Content Standards Addressed 64
  Activities Developed by Teachers of Indian Students 69
  My Ideas for Art Unit 95
  Lesson Plans/Schedule for Art Unit 96

Materials and Activities for Earth, Air, Water and Fire Unit 99
  Teacher's/Parent's Background Information 100
  Suggested Primary Level Unit Outline 102
  About the Literature 104
  Further Resources for Earth, Air, Water and Fire Unit 108
  Earth, Air, Water and Fire Words 110
  Science and Language Arts Content Standards Addressed 111
  Activities Developed by Teachers of Indian Students 117
  Lesson Plans/Schedule for Earth, Air, Water and Fire Unit 142
  My Ideas for Earth, Air, Water and Fire Unit 144

Materials and Activities for Music and Dance Unit 145
- Teacher's/Parent's Background Information 146
- Suggested Primary Level Unit Outline 148
- About the Literature 150
- Further Resources for Music and Dance Unit 154
- Music and Dance Words 157
- Science and Language Arts Content Standards Addressed 158
- Activities Developed by Teachers of Indian Students 163
- Lesson Plans/Schedule for Music and Dance Unit 188
- My Ideas for Music and Dance Unit 190

Additional Resources 191

INTRODUCTION

As we enter the next millennium, it is unfortunate that American Indian students, for the most part, are still not doing as well in school as they might. At the 1999 conference of the National Indian Education Association, I gave the banquet speech in which I said that we had failed because we still did not have the relevant curriculum for all Indian students that we had talked about for at least the 30 years I had been involved. After stating that, I felt obligated to be a part of the solution. My doctorate is in curriculum and instruction with an emphasis in the teaching of reading.

In my 30+ years in Indian education, I witnessed many classrooms in which students were totally disengaged. The instruction taking place was either totally boring or the topic was totally unrelated to anything the students knew or cared about. The relevant curriculum we had envisioned took place in the regular classroom, included content related to the lives of Indian children, made them proud, expanded to other experiences, and enhanced further learning. American Indians had highly developed societies before the white man came and have contributed much to this society. Indian children should know about these things. I read recently that NASA is looking to Indian people to help solve the global warming problem. Imagine the science and other knowledge needed to solve global warming.

Indian literature is a resource that can provide the basis for a culturally relevant curriculum. There are many more Indian authors writing books for children and more good Indian literature is being published. Many of the books include Indian stories that teach lessons for life and they are similar across tribes.

What I have done, essentially, is to survey all of the Indian literature available for young children, written by both Indians and non-Indians. It has fallen in eight topic areas, four of which are included in this book. The approach promoted is the integration of reading, language arts and science based upon the Indian literature and non-Indian books for young children. Materials and activities are aligned with the new, more challenging language arts, math and science standards. Also included are ideas for art activities and promotion of tribal values from the literature. Creative teachers might also include social studies and career education in this integrated approach. Indian studies classes and regular classes are to be coordinated around the topic areas so that language and cultural activities complement classroom instruction. The topic will provide a context for native language instruction and the goal should be conversational language. There are activities for parents and tutors as part of a comprehensive approach. This is not a canned curriculum; it contains all the ingredients necessary for a school to develop its own curriculum for the primary grades with an extension to homes and preschool children.

This document pays tribute to many: Indian and other authors who write books for Indian children, Indian and other organizations that distribute books especially by and about Indians, Indian and other organizations that have made the improvement of math and science instruction a priority, individuals who see the connection between Indian culture and science instruction, and teachers who have developed and then implemented culture-based curriculum in their classrooms. Many good activities have taken place across the country over the years. Many good materials have been developed but now sit on shelves or have disappeared. This attempt draws from some of them and will help to publicize new efforts.

Some of the materials and activities included here have been taken from the work of others. For example, some of the teacher's background information included comes from math and science materials developed by ORBIS Associates of Washington, DC, an Indian-owned company that focuses on education research and training. The math and science activities included were developed by teachers in Bureau of Indian Affairs-funded schools in summer workshops at Haskell Indian Junior College (Haskell Indian Nations University) in 1992 and 1993. I have drawn on the work of educators such as Richard Nichols, Gwen Shunatona and Anne Litchfield of ORBIS Associates; Dan Wildcat, Lucretia Herrin, Dr. Michael Ward, and Anita Chisholm who led the math and science workshops at Haskell. The section, *Additional Resources,* starting on page 191 lists science organizations and projects, teacher resources developed by Indian educators, and Indian book distribution organizations.

I hope that this document will be useful to parents, tutors, teachers, aides, administrators and school board members at schools where there are Indian students. I hope that Title IX and Johnson O'Malley programs can utilize it. I hope that parents who are homeschooling their children will find it helpful. I hope that teachers of non-Indian students will use it, especially for that week at Thanksgiving and, hopefully, beyond.

I have not read every book listed in this document, and if I did, I would not be able to guarantee their being free of cultural bias. I did utilize the publication, *Through Indian Eyes: The Native Experience in Books for Children* by Beverly Slapin and Doris Seale to avoid books that may be offensive. I tried to promote books written by Indian authors. If it is found that a book is not acceptable to Indian people or to a tribe, in particular, the book should definitely not be used. I recommend that books be reviewed by local Indian people to be sure. There is guidance for reviewing books in *Through Indian Eyes* and in a document developed by the Indian Community School of Milwaukee listed in the *Additional Resources* section. I would like to know if there is a book that should be eliminated from this document. I have heard varying opinions on this matter and on certain books. I just feel that we need to take a risk and help teachers who want to incorporate a more meaningful curriculum, but who do not have the time or the information to do so. Actually, if the use of the approach outlined in this document works, it should promote a resurgence of local storytelling and/or the writing of more children's books by Indian people.

Anyway, I hope that this document will help little children somewhere. I greatly enjoyed developing it. I hope others will enjoy using it to create a sacred place for young American Indian and other learners. – SJF, Oglala Lakota, Albuquerque, NM

CREATING A SACRED PLACE – ADMINISTRATORS/SCHOOL BOARDS

Consider this quote from Ron Edmonds of the Effective Schools movement:

> We can, whenever and wherever we choose, successfully teach all children whose schooling is of interest to us. We already know more than we need to do that. Whether or not we do it must finally depend on how we feel about the fact that we haven't so far.

We are at a time when it is being demanded that schools produce higher achievement. Students must learn to read and write at higher levels, they must be able to solve more difficult math and science problems, they must be adequately prepared to meet the world and function successfully in the 21st Century. We must change the way we do things in order to produce these results. Schools have been failing students. Part of the problem is that we don't do what we know should be done, as Ron Edmonds states.

For example, in regard to American Indian students and the teaching of reading, the research has said over and over that two major strategies are recommended: 1) utilize reading material that relates to the lives of the children so they understand that it is experience captured in written language and are interested in reading it and 2) strengthen and expand the language ability of children by providing a great deal of opportunity to have new experiences, learn new words and practice oral language in English and the native language.

For the most part, these two recommendations are not followed in schools that have American Indian students. Why not? Most reading instruction is done with reading books that seldom contain stories that relate to the lives of the children, and experience-based instruction and oral language practice require a great deal of work and make a noisy classroom which schools don't usually tolerate. Another part of the problem is that schools and teachers have many, many things to do in a day. They have so many things to do that, often, they don't do them well.

Another piece of information that we should pay attention to is found in a recent report from the U.S. Department of Education that indicates that children from high poverty areas are coming to school with English vocabularies of only about 3,000 words as compared to children from more affluent families that enter school with 20,000 word English vocabularies. Students with 20,000 word vocabularies learn to read and write much easier than those with 3,000 word vocabularies. If a child does not know the words he/she is to read on standardized tests, there is an automatic penalty. Schools that have Indian children must attend to vocabulary expansion by addressing language development in English and the native language.

Still another major consideration is the importance of parental involvement and early childhood education and experiences. Recent research tells us that the first three years of life are extremely important in preparing children for school. Schools must take advantage of this information and plan and implement programs that engage parents in activities with their children that will provide the foundations necessary for further learning when the children come to school.

This document is an attempt to help schools follow the recommendations made to improve the teaching of Indian children, utilize the information from recent research and reports, and help teachers do all the things they are required to do in a more efficient manner. It will primarily help teachers teach reading, language arts and science using American Indian and non-Indian stories and materials. The materials and activities are aligned with the new, more challenging language arts, math and science content standards required by school reform. At the same time, teachers can teach art and tribal values. Very creative teachers might also include social studies and career education in this integrated approach. This approach provides the opportunity for the Indian studies classes and regular classes to work closely together to reinforce classroom instruction with language and cultural activities. Parents and tutors play an important part. Imagine what can happen if all are working together toward the same goals.

If you are a parent or grandparent, you need to also read the section for parents and tutors. If you want to know more about how the approach suggested by this document would work, read the section for teachers and aides.

CREATING A SACRED PLACE - PARENTS AND TUTORS

More than ever before, teachers need the help of parents and tutors who can assist children in a one-on-one situation to give them the practice, support and assistance that they need individually to do well in school. As part of the national school reform effort, schools are being required to expect more from students and teach them more difficult things. For example, now all students are to "become good readers by the end of third grade." This has not happened in the past so this is now a national goal. In order to meet this goal, it will take a joint effort of teachers, parents, and tutors (if available).

What must be done to help our children? A recent report by the U. S. Department of Education indicated that many children are coming to school with English vocabularies of approximately 3,000 words as compared to other children that have English vocabularies of 20,000 words. The students with 20,000 word vocabularies have a much easier time learning to read and write. This tells us that teachers, parents and tutors must provide activities that will help expand children's English vocabularies. Children learn language by hearing and speaking. Strengthening children's native language use helps them learn English easier. Further, it is known that reading to children is the single, most important activity that parents can provide to help their children succeed in school. Here are some things parents and tutors can do:

> Talk more with children about school and everyday things. Have them recite poetry, sing songs, present various things they have learned. Play with them.
>
> Tell stories and read to children often. Ask them questions as you read to see if they are understanding the stories. Occasionally, have them retell the story or draw a picture about it.
>
> Teach children to be interested in words, how they are spelled, what they mean, and teach them new words. Have them write lists and short notes for you.
>
> As children learn to read, have them read to you-either the whole story, some of the pages, or pages after you have read them already. Ask them what they think about what happened in the story.
>
> Be actively involved in the children's school instructional program. Provide support for their learning and make available interesting and meaningful reading and other educational materials and activities for them.
>
> Be a role model and let the children see you reading and writing. Limit television watching in favor of time for reading and reading together.

The activities listed above should be done with children starting at birth, by talking and singing to them a lot in both English and the native language, and should be continued all the way through their primary school years.

This document contains lists of books that you and the children will enjoy. The books include stories and information about animals, art, the earth, and music and dance. The books include Indian stories that usually teach lessons and regular non-Indian books for young children. This document also contains word lists (pages 23, 63,110, 157) that parents can use for each of the topics and background information for parents on the topics (pages 12, 52, 100, 146). The lists of books are found in the sections entitled *Further Resources* and *About the Literature*. The books are categorized as follows:

> Phase 1: Awareness and Exploration
> Children explore their surroundings, building foundations for learning to read and write. This starts at birth and continues through preschool.

The activities listed on the previous page are good ways to help your children build foundations for learning to read and write. Books that are most appropriate for Phase 1 children are found on the *Further Resources* lists (starting on pages 20, 60, 108, and 154) and are marked with an asterisk (*). Books listed in the *About the Literature* sections for Phase 2 (pages 16, 56, 104, and 150) would also be good to read to preschoolers. The section *Additional Resources* at the end of this book contains a list of Indian ABC books. Your school or community library has picture books for preschoolers on the topics included in this book and other topics. Also, check bookstores and other stores.

The other phases are:

> Phase 2: Experimental Reading and Writing
> Children develop the basic concepts of print and begin to experiment with reading and writing. This is what they are to learn in kindergarten .
>
> Phase 3: Early Reading and Writing
> Children read simple stories and write about meaningful topics. This is what they are to learn in first grade.
>
> Phase 4: Transitional Reading and Writing
> Children begin to read more fluently and write using more complex sentences. This is what they are to learn in second grade.
>
> Phase 5: Independent and Productive Reading and Writing
> Children are capable readers and continue to refine reading and writing. This is where they should be by the end of third grade.

Based on these phases, parents and tutors can choose books from the various lists in this document in the sections called *About the Literature* or can choose from the *Further Resources* lists, especially if they are interested in materials from certain tribes or particular aspects of a topic. Also included are pages for parents or tutors to use to schedule and log reading time with children. Some parents may be homeschooling their children, in which case, they should also read the section for teachers and aides.

CREATING A SACRED PLACE – TEACHERS AND AIDES

Schools are involved in various school reform activities at this time. Teachers of the primary grades are being asked to do many things including:

align curriculum with the new content standards and new assessments,

do a better job of teaching reading and math,

utilize an integrated approach to teaching the various content areas,

teach for understanding and application and focus on depth,

teach disabled and gifted students in the regular classroom,

promote positive student behavior through a school-wide approach, and

provide meaningful parental involvement in the instructional process.

In addition, teachers of American Indian students are asked to:

incorporate American Indian content standards,

provide instruction for Indian children that is based upon research,

provide culturally relevant instruction within the regular classroom, and

promote the use of native languages to strengthen children's language ability.

This is only a partial list of the many things that teachers of primary students have to do. This document will provide assistance to teachers and aides who truly want to create a sacred place to support young American Indian or other learners and will help coordinate all that they have to do.

Essentially, the approach presented here combines the teaching of reading, language arts and science by utilizing American Indian and other literature as the basis for instruction. The materials and activities are aligned with the new, more challenging language arts, math and science standards and the American Indian standards. Teachers can also teach art and tribal values in relation to the topic and the literature. Some teachers might also include social studies and career education in this integrated approach. The approach provides the opportunity for Indian studies classes and regular classes to work closely together to directly reinforce classroom instruction with language and cultural activities. Parents and tutors have important parts to play, also.

A primary purpose of this effort is to help teachers do a better job of teaching Indian children to read. In order to meet the national goal of having all students be capable readers by the end of third grade, we must utilize all resources and all information available. A recent publication of the U.S. Department of Education, *Start Early, Finish Strong: How to Help Every Child Become A Reader*, includes the various phases in learning to read, what should be learned at the various grade levels and before.

Phase 1: Preschool - Awareness and Exploration
Children explore their environment, building foundations for learning to read and write.

Phase 2: Kindergarten – Experimental Reading and Writing
Children develop the basic concepts of print and begin to experiment with reading and writing.

Phase 3: First Grade – Early Reading and Writing
Children read simple stories and write about a meaningful topic.

Phase 4: Second Grade – Transitional Reading and Writing
Children begin to read more fluently and write using more complex sentences.

Phase 5: Third Grade – Independent and Productive Reading and Writing
Children continue to refine reading and writing for different uses and audiences.

The materials and activities presented in this document are organized generally according to these phases, although students at various phases within a classroom can be accommodated because the phases are assigned according to student interest level rather than strictly by reading levels of materials. Ungraded or multiage classrooms can also be accommodated and are encouraged.

The *Start Early, Finish Strong* document also indicates that children of low-income families come to school with an English vocabulary of approximately 3,000 words, whereas a child from a high-income family has an English vocabulary of 20,000 words. The child with a 20,000 word English vocabulary has a much easier time learning to read and write. If a child does not know the words he/she is to read, there is an automatic penalty on standardized tests. Vocabulary building, language development, is a key.

Start Early, Finish Strong states that teachers need to use a comprehensive approach to teaching reading and teach young children that language, in a meaningful context, is made up on words which contain sounds that are represented by letters and groups of letters. Presently, however, too many teachers think that phonics instruction will solve all their problems. Phonics rules do not apply to many words. Therefore, meaning and a rich vocabulary are necessary for children to recognize words for which phonics rules do not apply. Children need new experiences to learn new words; often this new experience comes from reading or words are recognized within context while reading.

Over the years, research regarding improving the teaching of reading for American Indian students has recommended two major strategies: 1) utilizing reading material that is culturally relevant, that relates to the lives of the children, including language-experience stories and American Indian literature, and 2) strengthening and expanding the language ability of the children by providing a great deal of opportunity for oral language activities in English and the native language, including many conversations, discussions, retelling stories, reciting, reporting, etc.

Further, the approach taken in this document promotes viewing Indian children generally as global learners rather than analytic learners. Global learners often:

> concentrate and learn when information is presented as a whole,
>
> respond to emotional appeals,
>
> tend to like fantasy and humor,
>
> process information subjectively and in patterns,
>
> easily identify the main idea in a story,
>
> learn easily through stories, and
>
> use story context to figure out unknown words.

And consider the following in regard to teaching elementary science:

1. Students should gradually develop a sense of what science is.
2. An explicit goal of science should be to introduce young children to as many different phenomena of the real world as possible.
3. Science should build an appetite among students for learning how phenomena in the world work and how they connect to each other.
4. Elementary science should convince children that they can become part of the world of science and remain members all their lives.

All of the above information, from the professional literature, is utilized in the development of the suggested curriculum units included in this document. The materials and activities can help teachers of American Indian students **successfully teach them**. Four units are presented, organized according to topics. The topics are based upon available American Indian literature for children and are: Hares to Horses; Art; Earth, Air, Water and Fire; and Music and Dance.

For each unit, the following are included:

1. Background information on the topic of the unit for the teacher.

2. A suggested scheme or outline showing how available American Indian literature and other children's literature can be formulated into a unit for kindergarten through third grade or for different phases within a multi-age or ungraded classroom. The units integrate language arts and science activities and suggest mathematics application and art activities that evolve from the topics. The units also include an emphasis on values and positive behavior, lessons learned primarily from the Indian stories.

3. Information about the suggested literature, the content it provides and why it is organized as it is. The literature is organized mainly by subtopics and assigned to phases more according to interest levels than reading levels. Therefore, in the literature suggested for a phase, there may be materials of different reading levels, but it is the subtopic and what is done with the material that makes the difference. Selection of literature to be used is ultimately the choice of the teacher with his/her own students in mind.

4. Further resources that can be used in place of some of the literary pieces selected for the unit or for further student reading/activities. A teacher may decide that he/she wants to use only literature from the tribe or area of the students that are being taught. Or he/she may want to use only literature written by Indian authors. The further resources lists provide a wider choice of materials to draw from.

5. A word list for the topic, to be used to recognize patterns in words and for vocabulary expansion. These lists are not exhaustive, and the teacher may decide not to use some of the words. The lists include many of the words of the topic and particular spelling patterns that they contain, which should be helpful. For vocabulary expansion, remember that vocabulary should not be taught by providing lists of words and multiple choice tests but by including new words in discussions, etc. Students should become fluent in "art words."

6. Example activities developed by teachers of American Indian children at math and science workshops held during the summers of 1992-1994 at Haskell Indian Nations University and the University of Kansas.

7. The new, more challenging language arts, math and science content standards that will be covered if the suggested unit is implemented.

8. A page for the teacher to put his or her own ideas for materials or activities.

9. Pages for lesson plans.

Other considerations are:

1. Teachers will have to secure the literature they will use then decide when and how to use it. Will it be told or read to students? Will students read it themselves or with assistance? Will the selection be read or heard over and over again? Will all students read the same selection or will different selections be used with different students? Teachers will have to determine these things based upon the interests and abilities of their students. Teachers will also have to determine whether students should then retell a story, respond to it, perform it, summarize and report information, etc., and if they should do so in writing or orally. The teacher should have literature circles in which students discuss, respond and compare and contrast stories. Teachers should regularly review the language arts standards to ensure their coverage.

2. The suggested units are developed so that teachers will teach for understanding and application utilizing a spiraling approach. For example, books should be read over and over, even from one grade to the next. Addressing the same topic and the same words over and over, from one level to the next, will provide mastery and then confidence as students move on to higher level materials. The patterns they see from one set of words can be applied to other words.

3. Teachers who utilize the approaches and activities included in these units will not have quiet classrooms. Students must be allowed a great deal of opportunity for oral language activities including meaningful conversations and discussions, oral recitations, retelling, reporting, performing, etc.

4. The school's Indian culture/language courses should be organized around the same unit topics and serve to provide the local tribal cultural and language instruction to complement each unit. The topic will provide structure and substance for native language instruction leading to conversational language.

5. The school must reach out to acquire parents' help. They must be trained to do the things that are listed on pages 3 and 4. Further, each week parents must be involved with their child in a meaningful homework assignment for a unit.

6. Social studies can be incorporated into the units, including the study of cultures and cultural diversity; the study of people, places and environments; global connections and interdependence; and the study of interactions among individuals, groups and institutions. Career education can be included.

7. Teachers should coordinate the science standards, both regular and Indian standards, resources such as Joseph Bruchac's Keepers books or Greg Cajete's materials, and the regular science program along with the literature and example activities to provide a comprehensive approach to science.

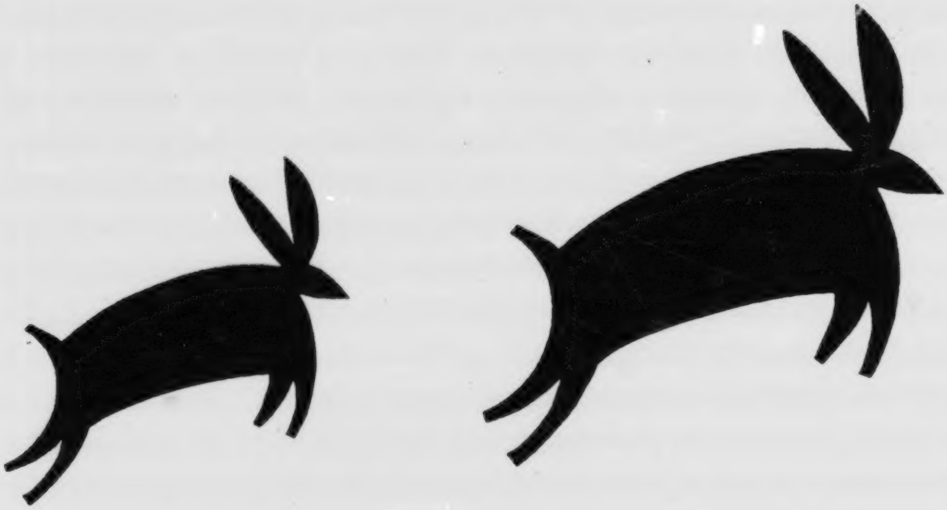
8. Teachers should formulate math situations and problems that relate to the topic areas and local situations and include the names of local stores, etc.

This document will not provide a teacher with a canned curriculum. The teacher or school should develop its own curriculum based upon the ideas in this book and available and acquired resources. This book contains suggested units covering 16 weeks to be used in the spring semester with Earth, Air, Water and Fire around Earth Day and the Music and Dance unit at the end of school before the powwow season. Again, this is only suggested. Many schools do not have a written curriculum and prefer to rely on their textbooks as their curriculum. It is important for a school to have a written curriculum so all teachers know what they are expected to teach. Without one, teachers usually teach whatever they want. The information in this guide can provide the basis for sound primary curricula for American Indian schools. Teachers must blend this information with good practices they are already undertaking such as regular sustained silent reading, language-experience activities, cooperative learning, the use of technology, etc.

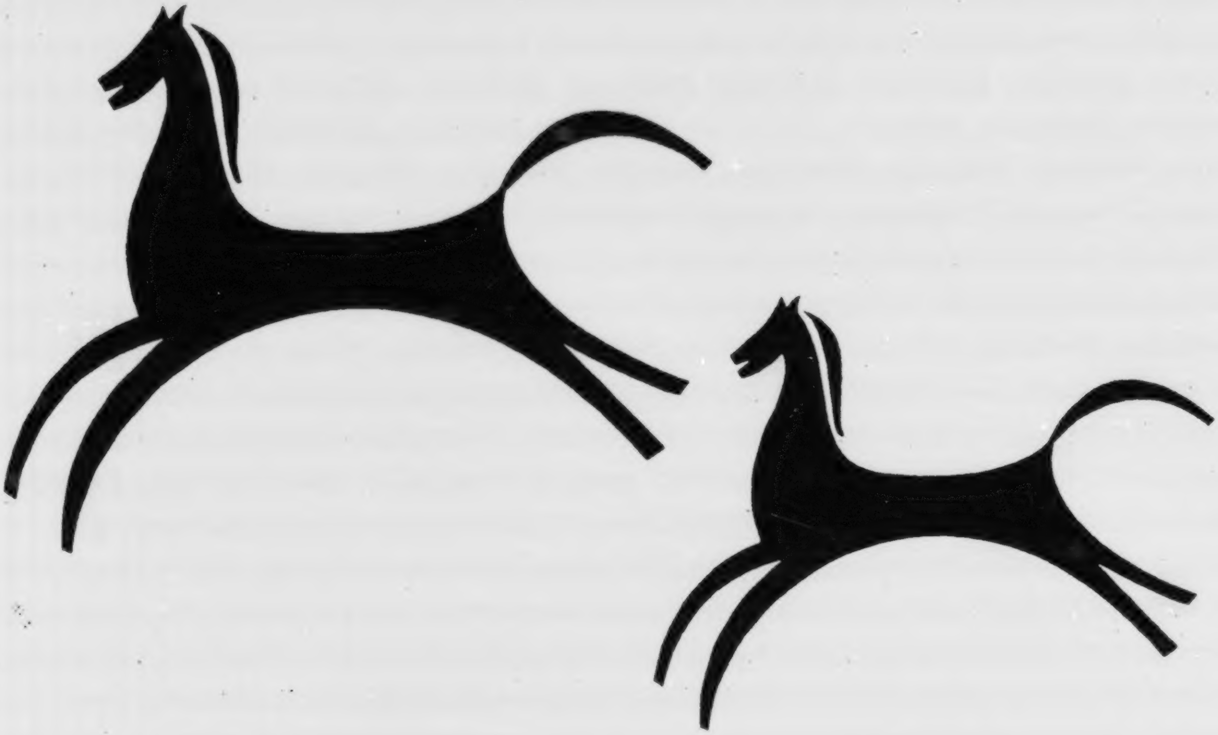
Teachers will have to choose which books to utilize. To check for bias, local tribal members can preview the books. The section, *Additional Resources,* at the end of this book provides a listing of vendors for purchasing books. Teachers should first check their school libraries and various classrooms to determine if some books are already available. If teachers find that they are lacking materials in certain topic areas, they can rely on language-experience stories. Teachers may find that some books are more appropriate at phases other than those to which they are assigned. That's good. The addition of videos and other media will serve to enhance instruction. Tribes often have their own anthologies of legends. And, of course, real storytelling by local elders or others around one of the topics would be excellent. This must be done, though, with regard to local traditions as some storytelling is appropriate only at certain times, and there may be other conditions that must be honored.

Imagine what a strong primary program you could have if you provided a program based upon the latest research and what is recommended for teaching Indian children, you coordinated your instruction with that of the Indian studies/language staff, and you acquired good parental support and assistance by having them provide reading and language time with their children You can supply them with books on the topics you are studying. You can have parents also learning and reading about the topics. They will be so much more interested in helping if they are a true part of the program. See the section for parents and tutors. If you have the luxury of having tutors for your students, they can also be extremely helpful by providing extra reading and language time, based on the topic areas, with your students. By having a program developed around themes or topics, you can do all these things easier.

Good luck as you create a sacred place for your students.



Hares to Horses



TEACHER'S/PARENT'S BACKGROUND INFORMATION -

The Study of Animals in Science Lessons

This unit is a continuation of the study of mammals in the Beavers to Buffalo unit in Volume 1 of *Creating a Sacred Place to Support Young American Indian and Other Learners*. The mammals included in this unit are: mice, rabbits, dogs, sheep, goats and horses. All of these animals might be pets. The Beavers to Buffalo unit concentrated on wild animals.

Indians and Horses

Indian people respect cattle, sheep and horses and many Indian people earn their livings by raising these animals. The horse is especially admired by Indian people and is kept for pleasure as well as for its usefulness on ranches.

When Spanish explorers came to America in the 1500s, they brought horses with them. At that time there were no horses in America. Some of the horses the Spanish brought got loose and roamed wild over parts of Mexico. The Spanish let other horses loose on purpose, because it would have been too much trouble to take the horses back to Spain. Some horses stayed in Mexico, living in the countryside there. Some of the horses traveled north, into what is now the western United States. These wild, ownerless horses were called mustangs. The name *mustang* comes from a Spanish word that means animal without an owner.

Years and years passed, and the herds of mustangs became larger. The horses became tough and hardy because only the ones that were strong enough to live in the wild could survive. These mustangs were small horses. Each adult mustang weighed from 600 to 800 pounds. Each adult mustang was about 56 inches high. These mustangs were not much larger than ponies, but they could run fast. They were beautiful animals, with long flowing manes and tails. Mustangs were all different colors – brown, tan, black, white, chestnut-colored, or spotted.

American Plains Indians caught mustangs. Their lives changed greatly with the coming of the horse. They rode these sturdy horses on buffalo hunts and during battle. Indians loved their horses and took good care of them. They were skillful riders, too. They rode bareback and rode without using their hands to hold on so they could use weapons and carry things. They painted their horses for battle. The mustangs were so important to Indians that they thought of them as part of the family. It was as an Indian horse that the mustang gained the greatest fame.

Today many Indian people are ranchers and use the horse to help them in the raising of cattle or sheep. They have learned how to best take care of these animals and to care for the land necessary to raise them.

Song of the Horse - Navajo

How joyous his neigh!
Lo, the Turquoise Horse of Johano-Ai
How joyous his neigh!
There on precious hides outspread standeth he;
How joyous his neigh!
There on tips of fresh flowers feedeth he;
How joyous his neigh!
There of mingled waters holy drinketh he;
How joyous his neigh!
There he spurneth dust of glittering grains;
How joyous his neigh!
There in the mist of sacred pollen hidden, all hidden;
How joyous his neigh!
There his offspring may grow and thrive forevermore;
How joyous his neigh!

SUGGESTED PRIMARY LEVEL UNIT OUTLINE – HARES TO HORSES

Reading, Language Arts, Science, Math, Art, Values	**Literature – Week 1**	**Literature – Week 2**
P Hares to Horses Words	*Charlotte and the White*	*Doesn't Fall Off His*
H Reading Fiction	*Horse* by Ruth Krauss	*Horse* by Virginia Stroud
A Comparing/Contrasting		
S Retelling/Responding	*Billy and Blaze* by	*Gift Horse – A Lakota*
E Mammals	C. W. Anderson	*Story* by S. D. Nelson
Height/Weight of Horses	*Black Beauty* by Robin	
F Horse Habits	McKinley/Anna Sewell	*Death of the Iron Horse*
I Uses of Horses		by Paul Goble
V Write/Illus. Horse Stories	*Belle's Journey* by	*Lone Bull's Horse Raid*
E Respect for Horses/Nature	Marilynn Reynolds	by Paul Goble
P Hares to Horses Words	*After Columbus: The*	*The Gift of the Sacred Dog*
H Reading Nonfiction	*Horse's Return to America*	by Paul Goble
A Summarizing/Reporting	by Herman Viola	
S Reading Legends		*Bringer of the Mystery Dog*
E Retelling/The Oral Tradition	*Once Upon a Horse: A*	by Ann Nolan Clark
Mammals	*History of Horses* by	
F Cost of Buying a Horse	Susan Jurmain	*Turquoise Boy – A Navajo*
O Survey #, Kind of Horses Near		*Legend* by Terri Cohlene
U Make Clothespin Horses	*Pinto Horses* by Janet	
R Respect for Horses/History	Gammie	
P Dog/Sheep/Goat Words	*Boomer Goes to School*	*A Friend Called 'Chum'* by
H Reading Fiction/Legends	by Constance McGeorge	Bernelda Wheeler
A Retelling/Responding		
S Reading Nonfiction	*Ben and the Porcupine*	Why Dogs Don't Talk
E Summarizing/Reporting	by Carol Carrick	Anymore in *And It Is Still*
Cost of Feeding Dog		*That Way* by Byrd Baylor
T Mammals	*Dogs* by Gail Gibbons	
H Dog Habits		*Dog People: Native Dog*
R List Kinds of Dogs	*Big Red* by Jim Kjelgaard	*Stories* by Joseph Bruchac
E Write/Illus. Dog Story		
E Respect for Dogs		*Dog Story* by Oren Lyons
P Mouse/Rabbit Words	*It's a Mouse* by D. M.	*Grass Mountain Mouse* by
H Reading Fiction/Legend	Souza	Ann Nolan Clark
A Retelling/Responding	*The Field Mouse and the*	
S Comparing/Contrasting	*Dinosaur Named Sue* by	*Field Mouse Goes to War*
E Mammals	Jan Wahl	by Edward A. Kennard
Cost of Mouse Cage/Food		
T Count Mice Placed in Room	*City Mouse – Country*	*The Story of Jumping Mouse*
W Make Egg Carton Mice	*Mouse* by John Wallner	by John Steptoe
O Respect for All Animals	*Mickey and Friends*	*The Mouse Raid* by M. Ward

Literature – Week 3	Literature – Week 4	Reading, Language Arts, Science, Math, Art, Values
Cowboys by Marie Gorsline *Horses, Horses, Horses* by Allan Fowler *Seneca* by Karen L. Baker *Once We Had a Horse* by Glen Rounds Buckin' Bronco – Shel Silverstein	*Out of the Saddle: Native American Horsemanship* by G. Pony Boy *What's the Most Beautiful Thing You Know About Horses* by Van Camp *Sioux Cowboy* by Ann Nolan Clark *Alice Yazzie's Year* by Ramona Maher	Hares to Horses Words Reading Nonfiction Summarizing/Reporting Reading Fiction/Poetry Retelling/Responding Raising Horses/Cost Rancher/Cowboy Visit Class Caring for the Land Respect for Land Respect Ranchers/Cowboys
Wild Horses by Glen Rounds *Baby Horses* by Dorothy H. Patent *Horse Heroes* by Kate Petty *Horses* by Elsa Pasell	*The Girl Who Loved Wild Horses* by Paul Goble *The Mud Pony* by Caron L. Cohen *How Wild Horses Were Captured*/Montana Council for Indian Education	Hares to Horses Words Reading Nonfiction Summarizing/Reporting Reading Legends Retelling/Responding Care of a Horse/Cost Horseman Visit Class Color Horse Pictures Class Poster/Kinds of Horses Respect for Horses/Nature
Charlie and Tess by Martin Hall *Woolly Sheep and Hungry Goats* by Allan Fowler *The Little Lamb* by Judy Dunn *Sheep* by Ann L. Hansen Mary Had a Little Lamb	*Little Herder in Summer, Little Herder in Autumn, Little Herder in Winter, Little Herder in Spring* all by Ann Nolan Clark *The Goat in the Rug* by C. Blood & M. Link *Ashkii and His Grandfather* by Margaret Garaway	Dogs/Sheep/Goat Words Reading Fiction Retelling/Responding Reading Nonfiction Summarizing/Responding Estimate Sheep/Classsroom Eyes Closed/Count Sheep Care of Sheep/Goats Sheep Rancher Visit Class Make Sheep w/Cottonballs Respect for Sheep/Land
Adventures of Peter Rabbit by Beatrix Potter *The Velveteen Rabbit* by by Margery W. Bianco *Jackrabbit* by Jonathan London *Rabbits, Rabbits and More Rabbits* by Gail Gibbons	*Rabbit and the Moon* by Douglas Wood *How Snowshoe Hare Rescued the Sun* by E. & D. Bernhard *Rabbit* by Don Birchfield *Muwin and the Magic Hare* by Susan H. Shetterly	Mouse/Rabbit Words Read Fiction/Legends Retelling/Responding Reading Nonfiction Summarizing/Reporting Care of Rabbit/Cost Draw/Color Rabbit Pictures Respect for All Animals

ABOUT THE LITERATURE FOR PHASE FIVE –

American Indian people have great respect and admiration for horses. Many Indian people ranch and participate in rodeos.

Horse Stories –

Charlotte and the White Horse by Ruth Krauss, Harper Trophy, 1999.
**Billy and Blaze* and others by C. W. Anderson, Aladdin, 1992.
**Black Beauty* by Robin McKinley and Anna Sewell, Random House, 1980.
**Belle's Journey* by Marilynn Reynolds, Orca Books, 1994.

These stories can be compared and contrasted.

Indian Horse Stories –

Doesn't Fall Off His Horse* by Virginia Stroud (Indian Author**), Dial. **Kiowa**
Gift Horse – A **Lakota Story* by S. D. Nelson (**Indian Author**), H. N. Abrams Pub., 1999.
Lone Bull's Horse Raid* by Paul Goble. **Plains
Death of the Iron Horse* by Paul Goble. **Plains

Cowboys, Horses and Care of Them –

**Cowboys* by Marie Gorsline, Random House, 1980.
**Horses, Horses, Horses* by Allan Fowler, Children's Press, 1992.
**Seneca* by Karen Lee Baker, Greenwillow, 1997.
**Once We Had a Horse* by Glen Rounds, Holiday House, 1996.
*Buckin' Bronco in *A Light in the Attic* by Shel Silverstein, Harper & Row, 1981.

Indian Cowboys –

Out of the Saddle: **Native American Horsemanship* by G. Pony Boy (**Indian Author**).
**What's the Most Beautiful Thing You Know About Horses* by Van Camp.
****Sioux** Cowboy* by Ann Nolan Clark, Lakota Books.
Alice Yazzie's Year* by Ramona Maher, Coward, 1977. **Navajo

Gifted and talented students can read the most difficult selections and report to the class or they can help the teacher read them to the class.

ABOUT THE LITERATURE FOR PHASE FOUR –

American Indian people have great respect and admiration for horses. Many Indian people ranch and participate in rodeos.

History of Horses in America –

**After Columbus: The Horse's Return to America* by Herman Viola, 1994.
**Once Upon a Horse: A History of Horses and How They Shaped Our History* by Susan Jurmain, Lothrop, Lee and Shepard, 1989.
**Pinto Horses* by Janet Gammie, Aldo & Daughters, 1996.

Indian people especially used pinto horses.

Indian Stories of How Horses Came –

The Gift of the Sacred Dog* by Paul Goble, Aladdin, 1980. **Lakota
Bringer of the Mystery Dog* by Ann Nolan Clark, **Lakota Books.
Turquoise Boy – A* ***Navajo* *Legend* by Terri Cohlene, Troll.

These are legends that can be retold in the oral tradition.

Horses, Baby Horses, Wild Horses and Hero Horses –

**Wild Horses* by Glen Rounds, Holiday House, 1993.
**Baby Horses* by Dorothy H. Patent, Carolrhoda, 1991.
**Horse Heroes* by Kate Peggy, DK Pub., 1999.
**Horses* by Elsa Pasell, A New True Book, Children's Press, 1985.

Indian Stories of Horses –

The Girl Who Loved Wild Horses* by Paul Goble, Aladdin, 1978. **Plains
**How Wild Horses Were Captured* by Montana Council for Indian Education, Billings.
The Mud Pony* by Caron Lee Cohen, Scholastic, 1988. **Pawnee

Gifted and talented students can read the most difficult selections and report to the class or they can help the teacher read them to the class.

ABOUT THE LITERATURE FOR PHASE THREE –
Indian people in the southwest raise sheep and goats and they use dogs to help them with the herds. Indian people everywhere have pet dogs.

Dog Stories –

**Boomer Goes to School* by Constance McGeorge, Chronicle, 1996.
**Ben and the Porcupine* by Carol Carrick, Houghton Mifflin, 1985.
**Dogs* by Gail Gibbons, Holiday House, 1996.
**Big Red* by Jim Kjelgaard, Holiday House, 1988.

Indian Dog Stories –

A Friend Called Chum* by Bernelda Wheeler (Indian Author**), Pemmican Books, 1985.
*Why Dogs Don't Talk Anymore in *And It Is Still That Way* by Byrd Baylor, Trails West, 1976. **Southwest Included in some basal readers**
Dog People: Native Dog Stories* by Joseph Bruchac (Indian Author**), Fulcrum. **Abenaki**
Dog Story* by Oren Lyons (Indian Author**), Holiday House, 1973. **Onondaga**

About Sheep and Goats –

**Charlie and Tess* by Martin Hall, Little Tiger Press, 1996.
**Woolly Sheep and Hungry Goats* by Allan Fowler, Children's Press, 1993.
**The Little Lamb* by Judy Dunn, Random House, 1977.
**Sheep* by Ann Larkin Hansen, Checkerboard.
*Mary Had a Little Lamb nursery rhyme

Indian Stories Including Sheep and Goats –

Little Herder in Summer, Little Herder in Autumn, Little Herder in Winter, Little Herder in Spring* all by Ann Nolan Clark, The Haskell Foundation, Haskell Indian Nations University. **Navajo
The Goat in the Rug* by Charles Blood and Martin Link. **Navajo
Ashkii and His Grandfather* by Margaret Garaway, Treasure Chest, 1989. **Navajo

Gifted and talented students can read the most difficult selections and report to the class or they can help the teacher read them to the class.

ABOUT THE LITERATURE FOR PHASE TWO –
Indian people have a reverence for all animals. Many Indian stories contain rabbits and mice.

About Mice and Mouse Stories –

**It's a Mouse* by D. M. Souza, Carolrhoda, 1998.
**The Field Mouse and the Dinosaur Named Sue* by Jan Wahl, Cartwheel Books, 2000.
**City Mouse – Country Mouse and Two More Mouse Tales from Aesop* by John Wallner, Scholastic, 1987.
**Mickey and Friends,* 1999, or any other Mickey Mouse book.

Indian Mouse Stories –

Grass Mountain Mouse* by Ann Nolan Clark, The Haskell Foundation, Haskell Indian Nations University. **Lakota
Field Mouse Goes to War* by Edward A. Kennard, The Haskell Foundation, Haskell Indian Nations University. **Hopi
The Story of Jumping Mouse* by John Steptoe, Lothrop, 1984. **Plains
The Mouse Raid* by Marlene Ward, Joyce Burr and Janet Ahler (Indian Authors**), Theodore Roosevelt Nature and History Association, Medora, ND, 1989. **Hidatsa**

These stories can be compared and contrasted.

About Rabbits and Rabbit Stories –

**Adventures of Peter Rabbit* by Beatrix Potter, Ideals Children's Books, 1997.
**The Velveteen Rabbit* by Margery Williams Bianco, Doubleday, 1958.
**Jackrabbit* by Jonathan London, 1996.
**Rabbits, Rabbits and More Rabbits* by Gail Gibbons, Holiday House, 2000.

Indian Rabbit Stories –

Rabbit and the Moon* by Douglas Wood, Simon & Schuster, 1998. **Cree
**How Snowshoe Hare Rescued the Sun* by E. & D. Bernhard, Holiday House, 1993.
Rabbit* by Don Birchfield (Indian Author**), Scholastic. **Southeast**
**Muwin and the Magic Hare* by Susan H. Shetterly, Atheneum.

These stories can be compared and contrasted.

FURTHER RESOURCES FOR HARES TO HORSES UNIT –
These materials can be used to substitute for books in the suggested unit outline or for additional reading/other activities for students.

The Mouse Couple by Ekkehart Malotki, (**Indian Author**), Northland Press. **Hopi**

How the Mouse Got Brown Teeth by Ray Smith, (**Indian Author**), Fifth House. **Cree**

Iktomi and the Buffalo Skull by Paul Goble, Orchard, 1996. **Lakota**

The Brave Mouse in And It Is Still That Way by Byrd Baylor, Scribner's, 1976. **Southwest**

The Gathering Mice, The Little Warrior Mouse and the Meadow Mice and the Moon in **Lakota** and **Dakota** Animal Wisdom Stories by Mark McGinnis, Tipi Press, 1994.

Do You See a Mouse? by Bernard Waber, Walter Lemoine Books, 1995.

Mouse Mess by Linnea A. Riley, Scholastic, 1997. **Included in some basal readers**

Deer Mouse at the Old Farm Road by Laura G. Galvin, Soundprints, 1998.

*Farm Mouse, House Mouse, Country Mouse, Town Mouse by Geraldine Dobbie, Patchwork Mice Series, Todtri Prod., 1999

*Mouse Count by Ellen Stoll Walsh, Red Wagon, 1995.

Do You Want To Turn Into a Rabbit? in And It Is Still That Way by Byrd Baylor, Scribner's, 1976. **Southwest**

How Jackrabbit Got Very Long Ears by Heather Irbinskas, Rising Moon, 1994.

Homer Little Bird's Rabbit by Limana Kachel, Montana Council for **Indian** Education, Billings, 1983.

Rabbit Tales in Temiskaming by Muriel N. White, Highway Book shop, 1972. **Indian**

How Rabbit Tricked Otter and other **Cherokee** Animal Stories told by Gayle Ross, (**Cherokee**), audiotape.

Rabbit and Coyote and others in **Navajo** Coyote Tales by Berard Haile, Univ. of Nebraska Press, 1984.

Rabbit's Wish for Snow: A **Native American** Legend by Tchin, Scholastic, 1998.

One More Bunny, Adding from One to Ten by Rick Walton, Harpercollins, 2000.

*Read to Your Bunny by Rosemary Wells, Scholastic, 1999.

*Rabbits by Fiona Patchett, Usborne Pub., 1999.

*Black and White Rabbit's ABC and Brown Rabbit's Shape Book by Alan Baker, Larousse Kingfisher Chambers, 1999.

How the Dogs Saved the **Cheyennes** by Hap Gilliland, Montana Council for Indian Education, Billings.

The Horse and the Dog in **Hidatsa** Culture by Gilbert Wilson, J & L Reprint Co. Vol. 10

All About Dogs and Puppies by Laura Driscoll, Grosset & Dunlap, 1998.

*Blue Goes to School by Angela C. Santomero, Simon Spotlight, 2000.

The Boy and the Dog by Siv Widerberg, R & S, 1991.

Bark, Spike, Bark, Simon Spotlight Rugrats Ready to Read, 1998.

*Clifford, the Big Red Dog by Norman Bridwell, Scholastic, 1985.

*Big Dog – Little Dog by Philip Eastman, Random House, 1973.

*I Am a Little Dog by Francois Crozat, Barrons Juveniles, 1990.

Cleo and the Coyote by Elizabeth Levy, Harpercollins, 1996.

Nanabah's Friend by Mary Perrine, Houghton Mifflin, 1970. **Navajo**

Nezbah's Lamb by Edith Agner, Friendship Press, 1954. **Navajo**

Little Man's Family, Little Books Series, Haskell Indian Nations University. **Navajo**

Navajo Life Series by Hildegard Thompson, Haskell Indian Nations University.

When the **Navajo** Had Too Many Sheep by George Boyce, Indian Historian Press, 1974.

Stephannie and the Coyote by Jack Crowder, 1970. **Navajo**

Billy Whiskers: The Autobiography of a Goat by Frances T. Montgomery, Dover, 1985.

Goats: Farm Animals by Ann L. Hansen, Checkerboard Lib., 1998.

Sheep by Tessa Potter, Steck-Vaughn.

*Sheep Out to Eat and Sheep in a Shop by Nancy Shaw, Houghton Mifflin, 1992.

Singing **Sioux** Cowboy by Ann Nolan Clark, Lakota Books.

My **Navajo** Sister by Eleanor Schick, Simon & Schuster, 1996.

The Spotted Horse by Henry Tall Bull (**Indian Author**), Montana Council for **Indian** Education, Billings.

Blue Canyon Horse by Ann Nolan Clark, Viking, 1954. **Southwest**

Coyote and the Cowboy and others in **Hopi** Coyote Tales by Ekkehart Malotki (**Indian Author**), Univ. of Nebraska Press, 1984.

Paul Goble Gallery includes The Girl Who Loved Wild Horses and Gift of the Sacred Dog, Simon and Schuster, 1999. **Plains**

My Horse Coloring Book by John Green, Dover, 1994.

Bronco Busters by Alison C. Herzig, Putnam, 1998.

Birth of a Foal by Hans-Neinrich Isenbart, Carolrhoda, 1986.

*The Horse by Emanuela Bussolati, Boyds Mill, 1993.

Horse by Emily Bolan, Barrons Juveniles, 2000.

Yaqui Myths and Legends by Ruth W. Giddings, University of Arizona Press, 1993.

And Still the Turtle Watched by Sheila MacGill-Callahan. **Indian**

The **Indian** Way: Learning to Communicate with Mother Earth by Gary McLain, John Muir Pub., 1990.

Red Ribbons for Emma, New Mexico Energy Collective, New Seed Press, 1981. **Navajo**

Between Sacred Mountains: **Navajo** Stories and Lessons from the Land, Rock Point Community School (**Indian Author**), University of Arizona Press.

CHECK YOUR LIBRARY OR BOOKSTORES FOR OTHER BOOKS RELATING TO THE TOPIC.
***These books are especially suitable for Phase One – for preschool children.**

HARES TO HORSES WORDS

Beginning Sounds –

bark
barn
bareback
big
bone
buck
bunny
buckskin
bronc
bridle
break
brand
braid

saddle
sorrel
spotted
spurs
snort
sniff
squeak
stud
stallion
stirrup
Shetland
sheep
sheep dog
shear
shelter

cage
carrots
cottontail
collie
colt
coat
corral
cowboy
cowgirl
cinch
cheese

tail
tame
trot
trap
veterinarian
vaccination
water
wild
wool
woolly

whine
whiskers

dog
dog food
drink
fast
fur
feed
food
foal
gate
gallop
goat
graze
grass
groom

hay
halter
hare
herd
hop
hole
hoof
howl
horn
horse
horseshoe
horseman
horsemanship

lamb
legs
lettuce
little
leather
mice
mouse
mane
mare
paw
pet
pinto
pony
puppy
playful

rabbit
ram
rawhide
rein
rearing
roundup
rodeo
rope
run
ride
riding
rigging

Singular-	Plural-
mouse	mice
rabbit	rabbits
bunny	bunnies
hare	hares
dog	dogs
puppy	puppies
sheep	sheep
lamb	lambs
horse	horses
pony	ponies
goat	goats
hoof	hooves

Compound Words-

cowboy
cowgirl
horseman
buckskin
jackrabbit
bareback
roundup

Ch and Sh Words-

cheese
cinch

Shetland
shear
sheep
sheep dog
shelter

Other Words-

Appaloosa
Quarter Horse
neigh
ewe
ears
eat

Word walls should be maintained. Instructors should ensure that students know the meanings of these words in this context and extend vocabulary by noting how they may mean other things in other contexts or they may have homophones. Experiences, pictures and illustrations should be used to explain and process word meanings. Words that rhyme with these words can be examined to extend vocabulary and to see varying spellings for sounds. Other words should be added.

SCIENCE STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN ANIMALS – HARES TO HORSES UNIT-

Standard – Understands that scientific inquiry works in particular ways
Benchmarks –
Understands that learning can come from careful observations

Standard – Understands the main individual, social, ethical and institutional aspects of science
Benchmarks –
Understands that learning can come from close observation of plants and animals, but they should not be mistreated

Standard – Understands the processes that shape the surface of the earth and the relation of the surface of the earth to the living environment
Benchmarks-
Knows that change is something that happens to many things around us
Knows that living things respond to the conditions around them

Standard – Knows about the diversity and unity that characterize life
Benchmarks-
Knows that some animals and plants are similar in appearance and behavior, and others are very different from one another
Knows that stories sometimes give plants and animals attributes they really do not have

Standard – Understands the genetic basis for the transfer of biological characteristics from one generation to another
Benchmarks-
Knows that offspring grow up to be similar to their parents.

Standard – Knows the general structure and functions of cells in organisms
Benchmarks-
Knows that most plants and animals need air, food and water
Knows that plants and animals are composed of different parts, serving different purposes and contributing to the well-being of the whole organism.

Standard – Understands how species depend on one another and on the environment for survival
Benchmarks-
Knows that animals eat plants or other animals for food and may also use plants for shelter

Standard–Understands cycling of matter and energy flow through the environment
Benchmarks-
Knows that plants and animals need water, animals need food to eat and plants need light

Standard – Understands the basic concepts of the evolution of species
Benchmarks-
Knows that plants and animals have features that help them live in different environments

Standard – Understands the main steps in the transformation of a single fertilized cell into a fully-formed animal, and the process of the development and aging that follows birth
Benchmarks-
Knows that animals have offspring, usually with two parents involved

Standard – Understands that the way things work often changes with scale
Benchmarks-
Knows that many things in nature come in sizes and speeds that are very different – from very small to very large, very fast to very slow, and so on

MATHEMATICS STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN HARES TO HORSES UNIT-

Standard –Effectively uses a variety of strategies within the problem solving process
Benchmarks-
Brainstorms possible things to do
Draws pictures to represent problems
Represents problem situations using physical objects
Clarifies problems using discussions with teacher or knowledgeable others
Uses guess and check to solve problems
Clearly states problems in his or her own words
Checks the reasonableness of results through estimation

Standard –Understands and applies basic and advanced properties of numbers
Benchmarks-
Has a general understanding of the concept of number
Uses counting to exemplify numbers
Understands the relationship of fractions and decimals to whole numbers

Standard – Uses basic and advanced procedures while performing computation
Benchmarks-
Adds, subtracts, multiplies, divides whole numbers with accuracy
Adds, subtracts, multiples, divides decimals with accuracy

Standard – Understands and applies basic and advanced methods of measurement
Benchmarks-
Understands the relationships between length, width and height
Understands the basic characteristics of weight and how it is measured

Understands the basic characteristics of area and how it is measured
Understands the basic features of mass
Makes effective use of ruler and scale for making measurements

Standard – Understands and applies basic and advanced concepts of data analysis and distributions
Benchmarks-
Has a basic understanding of the concept of data
Collects and organizes simple data sets to answer questions

LANGUAGE ARTS STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN HARES TO HORSES UNIT –

Standard – Gathers information effectively through reading, listening and viewing
Benchmarks-
Provides an accurate retelling of the basic plot of simple stories the student has read, heard or viewed
Provides an accurate retelling of the main idea of simple expository information the student has read, heard or viewed
Understands that reading, viewing and listening are ways of gaining information about the world
Determines meaning of simple words from context
Creates mental representations for concrete information read, heard or viewed

Standard – Reads and responds to literature
Benchmarks-
Understands that stories have beginning, middle and ending episodes
Understands the genre of legends and fables

Standard – Communicates ideas and information in writing
Benchmarks-
Understands basic connections between spelling patterns and speech sounds
Understands basic phonological patterns in English
Expresses ideas in simple expository forms
Composes simple stories that express cohesive ideas
Experiments with different genre as modes for expressing ideas

Standard – Understands and applies basic principles of language use
Recognizes characteristic sounds and rhythms of language
Makes valid observations about the use of words
Makes valid observations about the use of language at home as opposed to the use of language in school

AMERICAN INDIAN CONTENT STANDARDS FOR PRIMARY GRADES ADDRESSED IN HARES TO HORSES UNIT –

SCIENCE

Science As Inquiry-
Indian students should develop an awareness that observations and understandings of nature traditionally formed an essential base of knowledge among Indian cultures.

Physical Science-
Indian students should develop an understanding of the innate properties of objects and materials that were (and are) recognized by traditional American Indian cultures in the manufacture and use of specific material objects that capitalize upon those properties.

Life Science-
Indian students should develop an understanding of plant and animal life cycles as exemplified in traditional American Indian concepts such as the Medicine Wheel.

Science in Personal and Social Perspectives-
Indian students should develop an understanding of local challenges in environmental protection and how traditional Indian knowledge, practices and philosophies have been and continue to be called upon for solutions.

LANGUAGE AND LITERACY

Indian students should be able to –

Listen for meaning and gain information from spoken English and a Native language.

Listen to Indian stories told in the oral tradition, comprehend their teachings and be able to retell them.

Speak coherently, conveying ideas in both English and a Native language.

Read fluently and independently, a variety of materials including those with American Indian themes.

Locate and use a variety of texts to gain information, for example, historical materials about their tribe, tribal legends and stories and oral history transcription.

Be familiar with children's literature with Indian themes, especially with that pertaining to the student's tribe and literature written by Indian authors.

MATHEMATICS

Mathematics as Problem Solving-
Indian students should formulate problems from everyday and mathematical situations within their home and tribal/community worlds.

Mathematics as Communication-
Indian students should relate their everyday language to mathematical language and symbols including expressing mathematical concepts in their Native languages.

Mathematics as Reasoning-
Indian students should believe that mathematics makes sense within their home and tribal communities and articulate examples of how it makes sense.

Estimation-
Indian students should explore estimation strategies through activities derived from their cultural worlds such as estimating the number of sheep/horses that fit in a pen/corral.

Number Sense and Numeration-
Indian students should construct number meanings through real-world experiences and use of physical materials.

Concepts of Whole Number Operations-
Indian students should develop meaning for the operations by modeling and discussing a rich variety of problem situations including some from the Indian world.

Whole Number Computation-
Indian students should use a variety of mental computation and estimation techniques in solving problems related to Indian cultural themes.

Measurement-
Indian students should understand the attributes of length, capacity, mass, and volume and relate these measures to use in their own cultural, home, tribal or community worlds.

Statistics and Probability-
Indian students should collect, organize and describe data related to local tribal/community demographics.

Fractions and Decimals-
Indian students should apply fractions and decimals by applying them to real world situations using Native cultural experiences.

American Indian Content Standards, ORBIS Associates for Office of Indian Education Programs, Bureau of Indian Affairs, United States Department of the Interior, 1996.

Example Activities Developed by Teachers of American Indian Students

Workshop on Culturally-Based Math and Science Curriculum Development
Haskell Indian Junior College
1992

MASTERS Project
Math and Science Teachers for Reservation Schools
University of Kansas and
Haskell Indian Nations University
Earth's Caretakers, 1993
Signs of Tradition, 1994

Ideas should be adapted for appropriateness. See appendix for how to order Earth's Caretakers and Signs of Tradition.

MATH AND SCIENCE --

"RANGE ECOLOGY"

CULTURAL OUTCOMES: II, IX
SCIENCE OUTCOMES: I, II, III
MATH OUTCOMES: II, VIII

CULTURAL OBJECTIVE:

Students will understand the Native American reverence for the relationship between plants and animals and their environment.

MATH OBJECTIVES:

Students will:

read a problem, think about it, choose an appropriate method of calculation, write the problem down, solve and analyze their answer

draw appropriate conclusions.

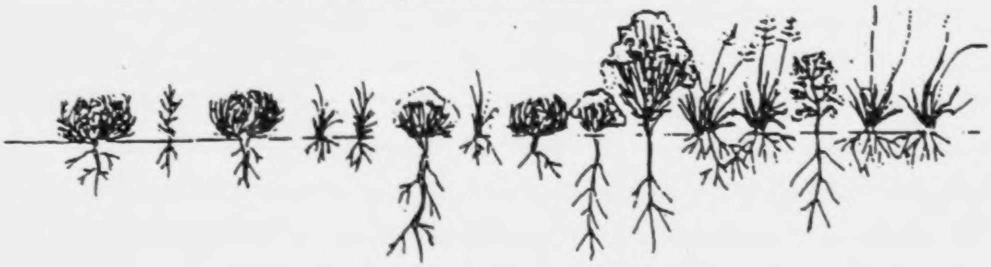
SCIENCE OBJECTIVES:

Students will:

understand the relationship between humans, plants, animals and the environment

know and use scientific recording and reporting skills

understand ecological relationships, including the human impact on nature and nature's impact on humans.



TEACHER'S BACKGROUND INFORMATION:

The Anishinabeg told the following story to illustrate man's dependence on the plant world:

Roses were once the most numerous and brilliantly colored of all the flowers. Such were their numbers and such were the variety and richness of their shades that they were common. No one paid much attention to them; their beauty went unnoticed, their glory unsung.

Even when their numbers declined and their colors faded, no one appeared to care. Cycles of scarcity and plenty had occurred. There was no cause for alarm. There is degeneration and regeneration. Plenty always follows scarcity.

But year after year, roses became fewer in number. As the numbers and richness of the flowers diminished, the fatness of the rabbits increased. Only the bear, bee, and hummingbird were aware that something was wrong.

The tribe felt that something was not quite right, but they couldn't explain it. They only knew that the bear was thinner and its flesh less sweet. The bears found smaller quantities of honey and what they found was less delectable, The bears and the hummingbirds found fewer roses. The tribe was bewildered; the bears blamed the bees; the bees were alarmed. No one could do anything.

Eventually one summer, there were no roses at all. Bees hungered; hummingbirds grew thin; the bears raged. In later years, that summer was known as "The Summer of the Disappearance of the Rose." At last, everyone was alarmed. In desperation, a great meeting was called. Everyone was invited.

There were many days of discussion before the meeting decided to dispatch all the swift to search the world for a single rose and if they found one, to bring it back. Months went by before a hummingbird chanced to discover a solitary rose growing and clinging to a mountainside in a far off land.

The hummingbird lifted the faint and pallid rose from its bed and brought it back. On arrival, medicine men and women immediately tended the rose and in a few days restored the rose to life. When he was well enough, the rose was able to give an account of the destruction of the roses.

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In a voice quavering with weakness, the rose said, "The rabbits ate all the roses."

The assembly raised an angry uproar. At the word, the bears, wolves and lynxes seized the rabbits by the ears and cuffed them around. During the assault the rabbits' ears were stretched and their mouths were split open. The outraged animals might have killed all the rabbits that day had not the rose interceded on their behalf saying, "Had you cared and watched us, we might have survived. But you were unconcerned. Our destruction was partly your fault. Leave the rabbits be."

Reluctantly, the angry animals released the rabbits. While the rabbits' wounds eventually healed, they did not lose their scars which remained as marks of their intemperance. Nor did the roses ever attain their former brilliance or abundance. Instead, the roses received thorns from Nanabozho to protect them from the avarice of the hungry and the intemperate.

Nanabozho, in endowing the roses with thorns, warned the assembly, " You can take the life of plants, but you cannot give them life."

...

The rose in this story can be compared to the endangered species of plants and animals which for so long were not noticed or cared for by the majority of the world's population. However, most of the Native Americans can be compared to the bear, the bee, and the hummingbird who did care, but were too small in number to achieve successful conservation by themselves. Only when it appeared that the rose had disappeared did the entire population become alarmed.

Let us consider other population groups and the ways in which they adjust their population to availability of food. The place where an organism lives is called a habitat. A group of one kind of organisms that live within the same area is called a population and the way the organisms are spaced or spread out in a given area is called the distribution. The home range is the area where a population of animals usually forages for food. There are 3 types of distribution:

a. uniform-evenly spaced.
b. random-irregularly scattered.
c. clumped-bunched together in different areas.

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Since plants can exist alone, they are called autotrophs and serve as the primary food producer in the food chain. Animals and humans are called heterotrophs since they can't exist without eating other living creatures, namely, plants, and are termed consumers. Thus, disruption or extinction of plant species has catastrophic effects upon the food chain and life cycles of all organisms. Careful treatment of Mother Earth and sensible methods of conservation are crucial for successful land and resource management.

After the Long Walk and the signing of a treaty, the Navajo returned to an economy based on sheep and other livestock. It is believed that by 1880 the Navajos' flocks surpassed the optimum livestock ratio for their land. A survey conducted in 1930 counted 1,111,589 mature sheep. In 1933 there were approximately 1.3 million sheep on the reservation. That is about 1 sheep for every 9 acres, while the carrying capacity of the range was 1 sheep for every 20 to 30 acres.

This type of imbalance occurred all across the western United States, causing the government to impose stock reduction on ranchers and also the Navajo people. The Dine' were unhappy about the stock reduction program because this was the base of their economy. Grazing regulations were approved for the reservation in 1956. However, severe damage had already been done to the range by overgrazing.

The following example shows what happens when grasses have been overgrazed. Note that snakeweed is poisonous to livestock.

1. The natural home of snakeweed is probably a rocky slope. Grasses grow better on the soils of the plain.
2. Animals can kill off grasses by biting them off again and again before they have a chance to grow. This leaves an open spot on the plain.
3. If livestock does not permit the grasses to grow, the snakeweed takes over the open area.
4. When snakeweed takes over, the animals go hungry.

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Plants' needs are specialized for their own environmental niche, although they all need soil, nutrients, water and light. Plants have varied sensitivities to amounts of nutrients, water and light that they need. Therefore, plants grow where their special adaptations make their survival possible. It is important to emphasize the importance of the interdependence of plants and animals, for they are all part of the Circle of Life.

Here are some examples of plants that are found on the reservation. These are some of the plants that the Department of Range Conservation plan to try to restore without a reduction in livestock:

1. Needle and thread grass--usually eaten before the seed has grown. Navajo--troh ts'ozi troh adishishi.

2. Alkali sacaton grass--a tall grass and the seeds can be used as food for humans. Navajo--troh dehakalii.

3. Indian rice grass-- grows about 2 feet high and seeds may be eaten by people. Navajo--nidididii.

4. Galleto grass--very hardy in dry weather and the leaves are very tough. Navajo--troh tsahii.

5. Winter Fat-- gray colored and is used for winter fodder for sheep. Navajo--gohtsohdii.

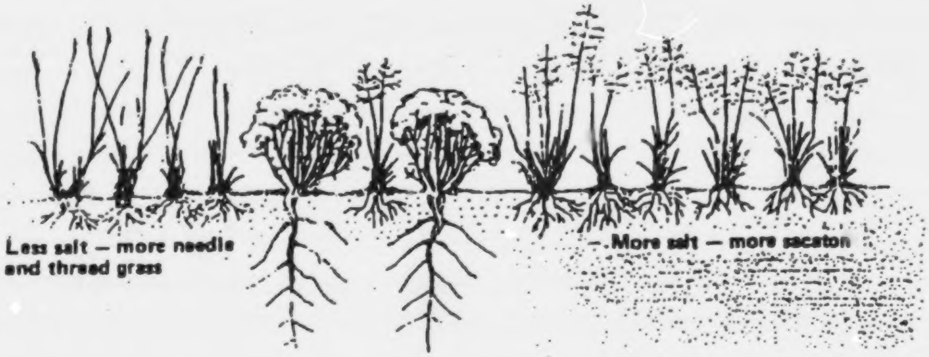
6. Sumac--a tall bush with red berries that can be eaten with sugar and cornmeal. Navajo--chitchin

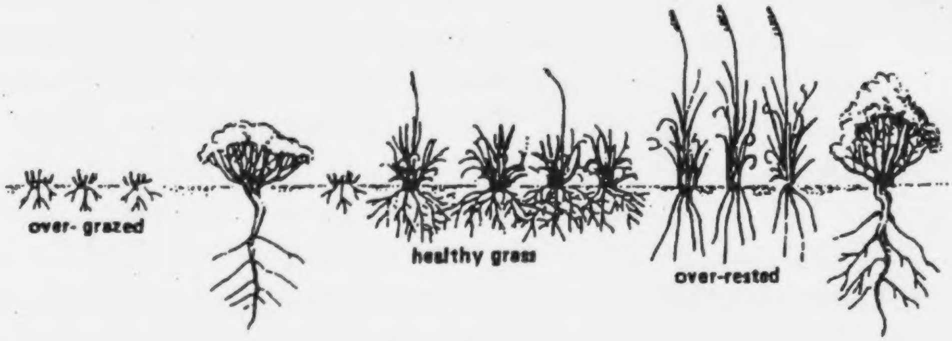
7. Goosefoot--the largest species of this plant needs a lot of water and is named "lambs quarter." Leaves and stems can be eaten when they are young. Navajo--troh deii tsoh.

8. Wild celery--small plant that should be picked before the flowers on the plant bloom. It is used in soups and stews.

Some individuals think that the Navajo can manage their grazing land with skillful herding. Some people believe it will be possible to have bigger and better herds by changing the old assigned permit areas and making the herds and flocks a group affair by pooling grazing permits.

The grazing committee for each chapter would be required to monitor and keep track of all the herds in their area. This idea is expressed in the video tape,"Distant Thunder."


Less salt – more needle and thread grass
More salt – more sacaton


over- grazed
healthy grass
over-rested

STUDENT LEARNING ACTIVITIES:

1. This first activity is a demonstration of how animals may compensate when there are excessive numbers of animals and a reduced food source.

   Each student will need 10 poker chips of one color, 6 poker chips of a different color and four sandwich bags. The teacher will need a clothesline (100 ft.), a stopwatch or just a watch with a second hand. The teacher should have the data sheet made before beginning the activity. Using the clothesline, the teacher marks off a circle outside that has a diameter of 10 meters. The 10 poker chips of like color for each student are to be scattered in that circle. Mark off 2 more areas that are at least 10 meters away from the first circle and place 1/2 of the remaining poker chips in each circle.

2. Have the students play a game involving deer population. Have the deer represented by the sandwich bags and the poker chips represent food for the deer. For the deer to survive 1 year (1 minute), it must obtain at least 5 chips but can obtain no more that 10. Remember that deer do not share food.

   Year 1: Have students predict how many deer will survive. All the deer should survive this year. Set the timer and have the students collect the food chips and place them in a plastic bag. Record the number of surviving deer on the data sheet.

   Year 2: Redistribute the chips. Give each of the students who had surviving deer an additional plastic bag. Set the timer and have the students again gather food for their deer. Anyone who does not have at least 5 chips for each bag is out of the game. Record the number of survivors.

   Year 3: Repeat year 2.

   Year 4: Hand out 1 more bag for each surviving deer. Tell the students that because of the large number of deer in the population last year, the plants that deer eat were damaged and food production has been decreased. Remove 1/4 of the food chips and redistribute the remainder in the home range. Then gather food chips and record the number of surviving deer.

   Year 5: Discuss with the group what the deer might do when the home range can no longer support them. Permit the group to search for new range, since the home range is depleted. At the end of the minute, call the group together and discuss how dispersal affected the number that survived.

Ask the following questions:

When was it easiest for the deer to survive and when was it the hardest?

What factors determined the carrying capacity of the home range?

If a person put out corn for the deer and then stopped suddenly, what would be the effect on the deer population?

3. Select the plants that are native to the home area and research information about the plants. The students will prepare illustrations which will include the scientific name, Indian name, uses of the plant, habitat and do an illustration of the plant. This should be done on display board or poster board.

4. Take a field trip to observe how plants and animals have adapted to a specific environment. They will then state a hypothesis, record data from their field trip and draw a conclusion which they need to verify with books on Botany and Zoology.

5. Draw a mural that shows how adaptations occur in nature. The students will describe the adaptations and state why these were necessary.

6. Interview individuals in their home areas. Students will explain that this is not a government survey but rather a class assignment. Inquire about the number of sheep, goats, cattle and horses they have. Students will graph this information using common area divisions.

7. Have a tribal ranger come to the school or have the class visit the ranger at the office. Ask the ranger to explain his jurisdiction and what his specific duties are.

8. Invite a Bureau of Land Management employee who has the responsibility of overseeing the reclamation of land to explain what the agency is doing to assist in reclaiming the land that has been overgrazed or otherwise destroyed.

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RESOURCES:

Anderson,Don. Native American Science and Mathematics. Fond Du Lac, Minnesota: Department of Education, 1987. pp. 29-30.

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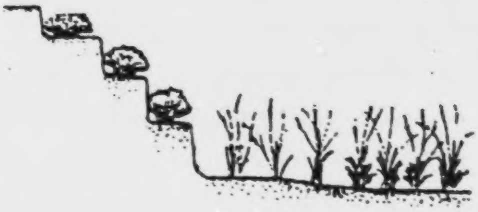
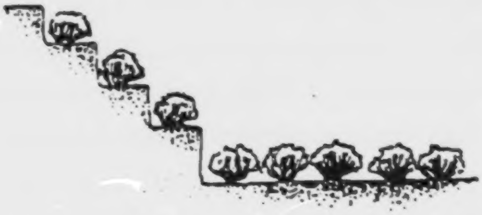
Jones, Thomas Jesse. The Navajo Indian Problem, An Inquiry. New York: 1939.

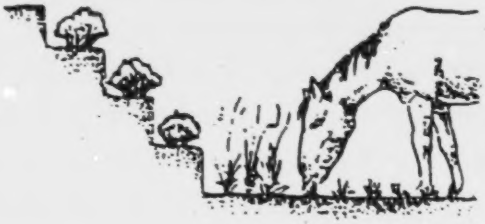
Evers, Larry. Between Sacred Mountains. Tucson, Arizona: Sun Track and the University of Arizona Press, 1984.

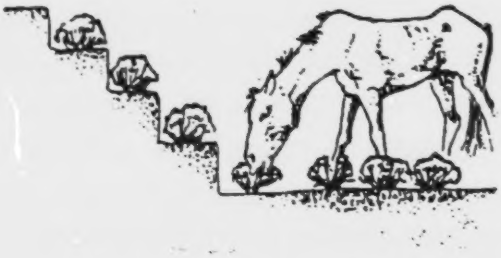
DEVELOPED BY:

Ivadene E. Dhority
Grover Parsons









Champion of the Classroom

Rose Star

Looking at the World Through the Eyes of Don YellowBird

Don YellowBird is a man of Arikara and Sioux descent. His home town, White Shield (population about 600 people), is on the eastern edge of Fort Berthold Reservation in North Dakota. Fort Berthold is often referred to as "The Home of the Three Affiliated Tribes." The Arikara, Mandan, and Hidatsa peoples have lived here cooperatively since 1862. At one time Fort Berthold was one large piece of land, but the United States Corps of Engineers built a dam in the middle of the reservation. The land is mostly farmland and badlands.

When Don was younger, he attended elementary and high school in Minot, North Dakota. After high school he went to college, Wahpeton State School of Science. Later he transferred to Grand Forks, North Dakota, where he earned his Bachelors and Masters Degrees in Education. He moved to White Shield where he has lived and worked as an elementary teacher for over fifteen years.

Don grew up as the middle child of 13 children. His mother, Dorothy, has always been very loving and supportive. His father, Grover, died years ago, but Don still feels his influence. His father was a firm disciplinarian, and had high expectations for Don which were sometimes hard to live up to. His parent's expectations gave him a sense of self responsibility and determination . . . values which helped him to attain many goals.

Don's many accomplishments include awards in track, football, cross-country, and basketball. He was honored in the Wahpeton's Hall of Fame for excellence in football. In 1986, the North Dakota Indian Education Association selected him as Indian Educator of the Year.

He helped organize the first North Dakota Native American Science Fair. Don felt that Native American children needed to be recognized for their talents and abilities. In the state science fair competition, only a small percentage of the participants were Native American students. He believed that Native American children would feel more comfortable participating in science fair competitions that were judged on science projects with special meaning to their culture.

He also worked with In-Med (American Indians in Medicine), where he helped coordinate programs to help Indian students who wanted to work in health fields. Don would like to see more Native American children become teachers, lawyers, doctors, and administrators to provide leadership. Don's love for working with the children brought him back to White Shield where he has continued to teach and coach.

For recreation, Don hunts, fishes, and plays golf. He goes hunting with his friends during hunting season every year, but he says he goes for the pleasure of walking in the "breaks,"

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observing wildlife, and enjoying the land. The "breaks" is a name for land that has been worn away by erosion of the soil, from rivers or the weather.

During hunting season, hunting for deer is called "harvesting." Each hunter is allowed to shoot one deer if the deer population is high. If the deer population is low, only a limited amount of deer hunting licenses may be sold restricting the number of hunters. Harvesting, he says, helps keep the deer population stable, because if the deer become too crowded there may not be enough food to feed the deer and they may starve to death. However, if the deer population become too low, then there is the chance they may become extinct.

When Don goes on these hunting and fishing trips he said that if you really look you can see many interesting things. You may even begin to imagine what life was like many years ago.

Don tells his own story:

One day, on a walk in the breaks, my students and I saw some petrified sequoia tree trunks and I wondered, "Sequoias in North Dakota?" I thought, "Now how could they be here?" One petrified sequoia was sitting there and had eroded all the soil around its trunk and was setting up in the air. . . like a trophy sits on its base! These great big sequoias are at least ten feet around. Perhaps the area down below in White Shield had been a big sequoia forest at one time. This would explain the rich coal deposit in White Shield. Coal comes from dead vegetation and dead animals and trees. There may have been a lot of dinosaurs here many years ago. Maybe when the dinosaurs died and their bodies decomposed under the weight of the soil, coal formed.

If you look at the soil, you see the clay in a lot of layers and you see the vegetation. When you look at the river, you can see how the water has eroded the shorelines and formed the river. As we looked around, we found a lot of edible plants, like wild turnips and berries (including bull berries, bear berries, and wild cactus berries). All these plants are growing on the land, feeding the inhabitants.

If you walk and don't run, you can see all these things. It's not just badlands; its a place of wonderment! It's a place that makes you wonder, "Why is this like this?" Lots of questions buzz through my mind as I walk on the land. Sometimes when my brothers and I are out walking along these paths, we might find some bones of cows and I wonder how did the bones get there. What happened? How did the animal die? By not hurrying, but stopping, looking, touching, and observing, each person gets a different picture of nature that exists right here in White Shield.

Once I saw some little ants and I observed them and I thought, "These little ants are amazing little insects! They're lifting hundreds of times their own weight." It would be like us, carrying a house on our back. Then we find there are different kinds and colors of ants. Some ants fight and some don't. There are millions of different insects and in order to see what each one does you have to sit and look and watch. If you don't stop to observe, you miss a lot of this stuff.

The time I like to be outdoors is in the morning. So many things happen in the morning. I have camped out overnight, and early in the morning I've seen deer come down to the water and drink. I've seen loons, too. You see ducks, geese, and swans fairly often, but to see a loon is a rare occasion!

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Take some time, get some binoculars, and observe all the different types of birds. One thing I have observed was the ducks. You see the males, they're so pretty, so beautiful! Then compare them to the females. They're so drab and plain. Why are male ducks colorful and female ducks plain? The answer is right there. Who has to protect the nest? Who has to camouflage right into the surroundings? The female duck! The male is the one who flies off and gets the attention and the female has to protect their nest, and her blending in is her cover, her protection. The female matches the reeds and grasses, while the male has bright colors on his head and chest that make him stand out. I've seen this in over 50 different species of ducks.

I think the bottom line is this: Do we want someone to destroy this? Where will the ducks live? Where will the ants live? Ants help to break down plants so that they may be recycled. People may kill off the insects by spraying insecticides and the wilderness will disappear, and our children will not see what we can see now.

Many farmers use chemicals to fertilize their fields and to kill insects. These chemicals filter down through the ground into underground rivers, called the groundwaters. Through natural springs this same water enters our rivers and is then taken into water treatment plants where some impurities are filtered and the water is recycled for us to use. Many impurities are still in the water. We drink this water. Animals (including cows, pigs, and chickens) drink the water. The chemicals are absorbed by plants. We in turn are swallowing those same chemicals into our bodies when we drink the water, eat the animals that drink the water and eat the plants, and when we eat the plants.

There are other more natural ways to make the soil rich and reduce the number of crop eating insects. We can use manure, the natural waste of livestock, as a fertilizer. It puts nitrogen back into the soil and won't hurt us. There are insects that can be put into these same fields, that will eat the insects that feed off the crops. Chemicals may or may not be quicker and easier, but they may be harmful to the earth and animals (including people). We need to think of what is the best way, to protect our environment and our lives. In the future, clean water will be more valuable than money. We have to learn to use water wisely.

Water also helps clean our air. After a rain, I like to go outside, take a deep breath and look around. I breathe in pure air, because the rain has cleaned the air of all impurities (like dust, smoke, and chemicals) by driving them into the ground. In that short period of time, we breathe in pure air. After a while, we start smelling pollution. But the smell of fresh air is great!

After the rain, I often see a rainbow. It is beautiful! A rainbow is made from water droplets suspended in the air like prisms. Sunlight is bent, or refracted, as it passes through the water droplets. Normally, we can't see the color of light. The colors: red, orange, yellow, green, blue, blue-violet, and violet are streaming down on us all the time. These seven colors are the colors of light, but when they shine together they turn to white light. After a rain, when the sun is to our back, the light rays hit a raindrop and are refracted and we see the colors of the spectrum: the rainbow.

The rain also nourishes the trees. Trees are pretty to look at and they give us shade. The grass is green, and nice to lie on. We often think of plants as the lowest form of life, but we

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really don't realize how important plants are. Where would we be without them? We use them for food. So do the animals that we eat, such as cows and pigs. This is called the food chain. One food chain begins with grass. The cows eat the grass and we eat the cows.

We also need plants for oxygen. People breathe in oxygen and breathe out carbon dioxide. Plants take in carbon dioxide from the air and give off oxygen. Oxygen is produced during the food making process of the plant called photosynthesis. Without this oxygen cycle, we would die. When we kill plants, we cut off our own oxygen supply. The Native Americans have known for many years the importance of the balance of nature and have used storytelling to help others understand and have respect for our environment.

Discussion Questions:

1. Why does Don YellowBird say that it is important to walk slowly and observe?
2. What role does deer harvesting have in the balance of nature?
3. Why are the colors of the male and female duck important?
4. Why should we care about groundwaters?
5. Why is it important to understand the way the land used to be and the way it is now?
6. Where do you see colors of the spectrum? What makes those colors?
7. If a food web is the complex interaction of many food chains, why is every plant and animal important?

Social Studies

Legends of the Horse

Objective:

To discuss the beliefs surrounding the arrival of the horse in North America.

Materials:

- *Turquoise Boy: A Navajo Legend* by Terri Cohlene. ISBN 0-86593-003-1.
- drawing paper
- crayons

Exploration:

A long time ago, before even your Grandmother was a baby, the Navajo People wandered the area we call New Mexico. There were no White people and no cars. There weren't even any horses! Now there are horses everywhere, but then there were none. How do you think the horses got there? Allow time for students to think about different ways the horse could have arrived.

Seminar:

Have students give their ideas. Remember to discuss each idea with an open mind. Encourage creativity.

Invention:

Different people have different answers to the same questions. Most people believe that the people who came to this area from Europe and Mexico brought the horses with them. Some of those horses escaped and ran free to build up herds of wild horses. Then the Navajo people found some of these horses by accident. The Navajo believe their Gods helped bring horses to them. I'm going to read you a story that tells you what the Navajo believe. This story is called a legend. A legend is an old story that help us understand what those people believe. Read the story, *Turquoise Boy*. Refer to the vocabulary section in the back of the story to help with unknown words.

Application:

Discuss the many different ways the Navajo lives could have been changed once they found the horses. Have students complete a bulletin board with different before and after pictures they have drawn showing the many different uses of the horse. Examples might include walking to one's home versus riding there; or people dragging something heavy versus having the horse carry it.

Extensions:

Students can create their own legends in answer to questions of how things came to be. Students could also translate some of their grandparents' or elders' stories of their youth into legends.

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Language Arts

Learning the Language of the Lakota

Objective:

Students will tell a story using words from the Lakota language.

Invention:

Benjamin's family spoke the Lakota language fluently. Students will have an opportunity to learn words from the Lakota language. Vocabulary and pronunciation will be introduced. The teacher should print the following words on cards and then show a matching picture card.

Pronunciations:

	English	Lakota (phonetic pronunciation)
Animals		
	dog	sunka (shoon´ kah)
	cat	igmu (ig moo´)
	horse	sunkawakan (shún kah wah kánh)
	cow	pte (ptay)
	bear	mato (mah toe´)
	deer	tahca (tak cha´)
	fox	sungila (shoon gee´ lah)
	pig	kukuse (koo koo´ shay)
	porcupine	pahin (pah heen´)
	prairie dog	pispiza (pee spée zah)
	racoon	wica (wee cha´)
	coyote	sungmanitu (shung mah´ nee too)
	buffalo	tatanka (tah tahn´ kah)
	wolf	sungmanitu tanka (shung mah´ nee too tahn´ kah)

Application:

Students can then write and share an animal story using the Lakota words they have learned.

Science

Animal Habits and Habitats

Objectives:

Students will identify animals near their homes. They will study their habitats and habits.

Note: Lakota pronunciations for animals appear in the previous lesson.

Materials:

- a variety of animal books
- color sheets
- crayons

Background Information:

Be familiar with animals in your area and their habitats, eating habits, and other information concerning them. Hang up pictures around the room a week or so before the lesson is taught. Encourage children to observe them.

Exploration:

Discuss various animals that students see around the reservation, city, or town. Discuss the animals' habitats and eating habits. Discuss how the animals and people in your area interact.

Seminar:

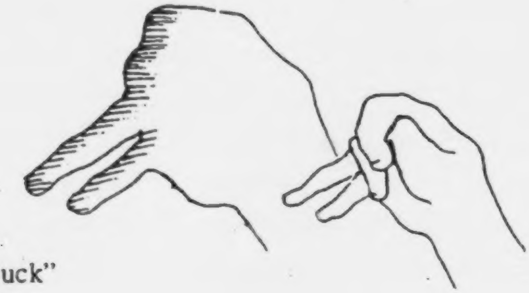
What is your house made of? Animal habitats are all similar and yet different in some ways. How is your habitat like the animals'? How are the two habitats different?

Invention:

An elder may be asked to come to class and share stories of animals on the reservation and their meanings and purposes to the Lakota or your own people long ago and today.

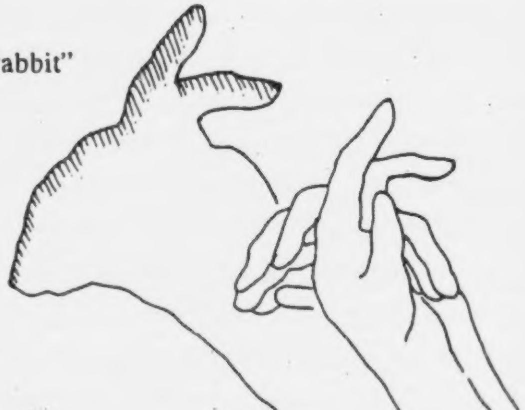
Application:

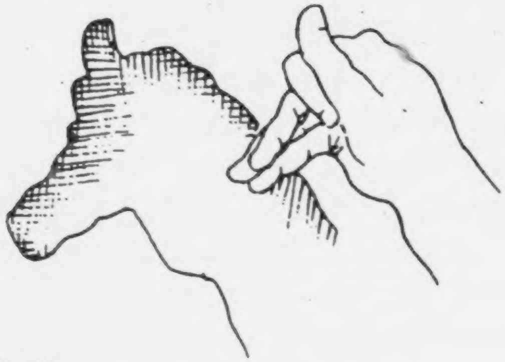
Students will use their imagination and draw a picture of themselves and an animal of their choice. Children will be encouraged to use ideas from one of the elder's stories.



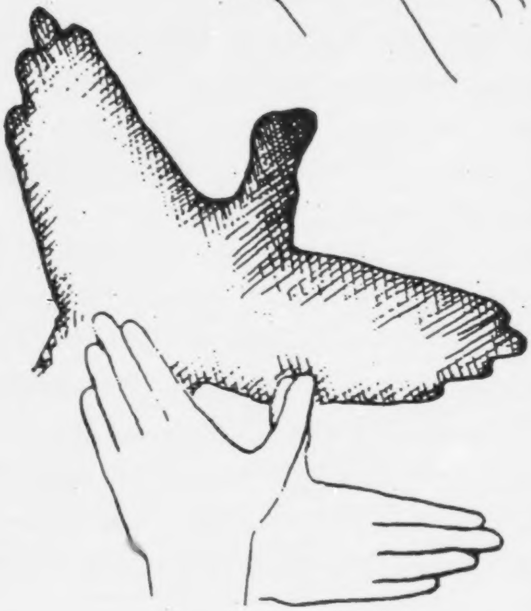
"duck"

"rabbit"

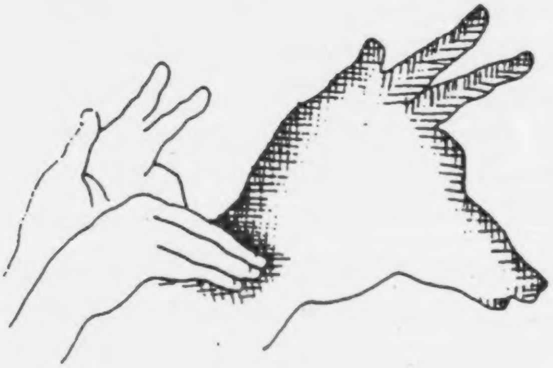




"dog"



"bird"



"coyote" ("Coyote is very wise and knows how to keep his mouth closed and his ears up.")

My Ideas for Hares to Horses Unit:

LESSON PLANS/SCHEDULE FOR HARES TO HORSES UNIT:

ART

TEACHER'S/PARENT'S BACKGROUND INFORMATION-

Indian Art

There are artists in every Indian tribe. This has always been the way. Probably every tribe had something only they made – a special way of showing their artistic talent. But most tribes shared much of the art styles with neighbors. Because of this, the art of Indian people can be grouped into culture areas. Indian people used things in their natural environments to make art objects. That's one reason art is not the same in one place as it is in another.

Indian people in each culture area have found many ways to express their love of beauty and their creative talents. Artists from many tribes still do traditional things. Here are just a few examples of tribal art from each culture area. See if you can tell why these tribal groups used certain things for their artwork because of where they live.

ARCTIC people carve on stone, bone, horn and ivory. Most art is used to decorate everyday tools, such as a knife handle or a harpoon head.

NORTHWEST COAST people are known for their carvings on totem poles, house fronts, canoes, and wooden boxes. These carvings are figures of animals, monsters, and human beings. Some of these carvings are painted, mostly in the colors red and black.

PLAINS tribal people painted their artwork on buffalo hides because, as hunters, hides were available to them. These hides were painted and decorated with porcupine quills. In some tribes symbols were painted on the outside of tipis. Colors most often used in painting were brown, red, yellow, black, blue and green. These are the colors of nature.

PLATEAU tribes painted and decorated their tipis, parfleche cases and shields. Clothing was decorated with porcupine quills, shells, elk teeth, feathers, and bear claws. They also wove cornhusk bags and other types of baskets.

SOUTHWEST people create their artwork on pottery, baskets, woven cloth, jewelry and in sand paintings. Designs often use shapes, but pictures of birds, animals, and human beings are used, too.

SOUTHEAST people used their own bodies on which they painted beautiful and detailed designs. The most common colors were red, black, yellow, white and blue. People's clothing was also richly decorated with shells and feathers.

NORTHEAST people were artists who painted on bark, something that was easily found in the forests where they lived. They also made beautiful wood carvings. Clothing and bark baskets were decorated with porcupine quills. Some artists carved pipes from stone. Over the years, these culture groups borrowed from each other and developed new forms of art. Indian artists are still at work making things that tell us about their traditions. Some Indian artists are borrowing from the art of the past or other tribal groups to create something brand new. These new art styles help us understand what Indian cultures are like today.

The oldest kind of Indian art was made thousands of years ago. It is known as "rock art." There are different kinds of rock art. The most common are PETROGLYPHS which are carvings made on the surface of rocks. Another kind is called PICTOGRAPHS. These are rock paintings. Some Indian people also carved whole figures out of rock, SCULPTURES. Some of these sculptures were tools that were for everyday use, like grinding stones, bowls, and hammers. Some were art objects of religious importance. Other stone art was carried by special people to show they were leaders of the tribe.

The figures carved or painted on rocks shows animals, people, monsters, or shapes, like circles and squares. Some of these were put there to tell a story. Others were for religious purposes. Some were probably meant to entertain or be funny, like a comic strip in a newspaper. Because rock does not rot away like wood does, much of the Indian rock art has lasted many thousands of years. People can see them even today. This rock art gives us a chance to enjoy the work of Indian artists who lived long ago.

from *Indian Culture Units on American Indians: Visual Arts,*
ORBIS Associates, Washington, DC, 1987.

Reference: *Introduction – Indian Art*, Airport School District, Michigan.

SUGGESTED PRIMARY LEVEL UNIT OUTLINE – ART

Reading, Language Arts, Science, Math, Art, Values	**Literature – Week 1**	**Literature – Week 2**
P Art Words	*A Tour of Western Art*	*Where There Is No*
HUsing Reference Books	by Carole Armstrong	*Name for Art* by Bruce
A Reading Biographies	*The Boy Who Loved to*	Hucko
S Retelling/Responding	*Draw: Benjamin West*	*Forbidden Talent* by
E Science of Color	by Barbara Brenner	Redwing Nez
Cost of Art Items	*Shadow Catcher: Life and*	*The Ledgerbook of*
F Writing Description of Art Item	*Work of Edward Curtis*	*Thomas Blue Eagle*
I Create Art Item	by Laurie Lawlor	by Gary Matthaei
V Math for Art Item	*Georgia O'Keefe* by	*Contemporary American*
E Respect for Art/Artists	Linda Lowery	*Indian Artists*/D. Reno
P Art Words	*Redoute: The Man Who*	*Weaving: a California*
H Using Reference Books	*Painted Flowers* by	*Tradition* by Linda
A Reading Biog./Nonfiction	Carolyn Croll	Yamane
S Reading Legends	*Fun with Flower Stencils*	Waw Giwulk: Center of
E Retelling/Responding	by Paul Kennedy	the Basket & The First
Weaving Baskets		Basket in *Keepers of*
F Geometry in Designs	*Landscapes (Start with*	*Life*/Caduto & Bruchac
O Writing Directions/Basket Making	*Art)* by Sue Lacey	*Little Indian Basket*
U Science of Baskets	*Landscapes* by Peggy	*Maker* by Ann Nolan
R Respect for Art/Artists	King	Clark
P Art Words	*Child's Book of Art* by	*Before You Came This*
H Using Reference Books	Lucy Micklethwait	*Way* by Byrd Baylor
A Reading Nonfiction		
S Reading Fiction	*Emma's Rug* by Allen Say	*Stories on Stone: Rock*
E Retelling/Responding		*Art, Images from the*
What Is Art?	*The Painter* by Peter	*Ancient Ones* by
T Learning from Rock Art	Catalanotto	Jennifer Dewey
H Time and Art	*Squeaking of Art: The*	
R Drawing Pictograph Story	*Mice Go to the Museum*	*Picture Writing of the*
E Writing What Story Says	by Monica Wellington	*American Indians* by
E Respect for Art/Artists		Garrick Mallery
P Art Words	*The Art Lesson* by Tomie	*Legend of the Indian*
H Reading Nonfiction/Biography	dePaola	*Paintbrush* by Tomie
A Reading Fiction		dePaola
S Retelling	*What Do Illustrators Do?*	
E About Illustrators	by Eileen Chriselow	*The Goat in the Rug*
Cost of Art Supplies		by Blood and Link
T Mixing Colors	*Country Artist: A Story*	*The Quilt Story* by
WWrite and Illustrate Book	*About Beatrix Potter* by	Tony Johnston &
O Respect for Art/Artists	David R. Collins	Tomie dePaola

Literature – Week 3	Literature – Week 4	Reading, Language Arts, Science, Math, Art, Values
Shota and the Star Quilt by Bateson-Hill and Runs Close to Lodge *Morning Star Quilts* by Florence Pulford *The Patchwork Quilt* by Valerie Flournoy *The Josefina Story Quilt* By Eleanor Coerr	*Songs from the Loom* by Monty Roessel *Navajo Rugs and Blankets* by Chuck & Andre Mobley *Morning Arrow* by Nanabah Chee Dodge *The Button Blanket*/NW Coast Activity Books	Art Words Reading Fiction Using Reference Books Make Quilt/Rugs/Shawls Science of Dyeing Wool Geometry in Star Quilts Math in Making Quilts/Rugs Artist/Quilter/Weaver Visit The Giveaway/Gratitude Appreciation/Art/Generosity
When Clay Sings by Byrd Baylor *Children of Clay* by Rina Swentzell *Little Indian Pottery Maker* by Ann Nolan Clark *Helen Cordero and the Storytellers of Cochiti* By Nancy S. Howard	*Kids 'N Clay Ceramics Book* by Kevin Nierman *Clay Modeling with Pooh* by Laura Torres *Create Anything with Clay* by Sherri Hoab	Art Words Using Reference Books Reading Nonfiction Making Pots/Figures Science of Pottery Writing How Your Pot Sings Have Potter Visit Class Measuring Patterns/Designs on Pots Appreciation of Pottery
Quillworker: A Cheyenne Legend by Terri Cohlene *The Pine Ridge Porcupine* by Ann Nolan Clark *Where Did You Get Your Moccasins?* by Bernelda Wheeler	*Small Animals of North America Coloring Book* by Elizabeth McClelland *Hand Print Animal Art* by by Carolyn Carreiro *Superdoodle Mammals* by by Bev Armstrong *I Can Draw Animals* by Tony Tallarico	Art Words Reading Fiction/Legends Retelling Using Reference Books Creating Designs Do Simple Beadwork Draw Animal Pictures Local Bead/Quillworker Visit Local Artist Visit Write About Local Artisan Appreciation of Art
Grandmother Spider Brings the Sun by Geri Keams *Dreamcatcher* by Audrey Osofsky *Grandmother's Dreamcatcher* by Becky McCain	*Harold's Trip to the Sky* by Crockett Johnson *The First Starry Night* by Joan S. Isom *The Starry Night* by Neil Waldman	Art Words Reading Fiction/Legends Reading Biography What is Art? Make Dreamcatchers Fingerpaint "Starry Night" "Starry Night with #_Stars" Have Artist Visit Class Appreciation of Art

ABOUT THE LITERATURE FOR PHASE FIVE –

Indian people have always been artists. Indian art has become very popular in the nonIndian world and has influenced nonIndian art.

About Art and Artists –

**A Tour of Western Art* by Carole Armstrong, 1999.
**The Boy Who Loved to Draw: Benjamin West* by Barbara Brenner, Houghton Mifflin, 1999.
**Shadow Catcher: Life and Work of Edward Curtis* by Laurie Lawlor, 1994.
**Georgia O'Keefe* by Linda Lowery, On My Own Biographies, 1996.

Indian Art and Artists –

Where There Is No Name for Art* by Bruce Hucko. **Pueblo
Forbidden Talent* by Redwing Nez, Northland Pub., 1995. **Navajo
The Ledgerbook of Thomas Blue Eagle* by Gary Matthaei **Lakota
Contemporary* ***American Indian* *Artists* by Dawn Reno.

Indian and Other Quilts –

Shota and the Star Quilt* by Margaret Bateson-Hill, Consultant Gloria Runs Close to Lodge, Lakota text by Philomine Lakota (Indian Author**), Zero to Ten, Ltd., 1998. **Lakota**
Morning Star Quilts* by Florence Pulford. Fifty full-color photos of **Indian star quilts.
The Patchwork Quilt* by Valerie Flournoy, Dial Books, 1985. **Also found in some basal readers
**The Josefina Story Quilt* by Eleanor Coerr, Harpercollins, 1986.
These stories should be compared and contrasted.

Indian Blankets, Shawls, Rugs –

Songs from the Loom – A* ***Navajo* *Girl Learns to Weave* by Monty Roessel (**Indian Author**), Lerner We Are Still Here Series.
**Navajo Rugs and Blankets, A Learning Coloring Book* by Chuck and Andrea Mobley.
Morning Arrow* by Nanabah Chee Dodge (Indian Author**), Lothrop, 1975. **Navajo**
The Button Blanket,* a **Northwest Coast Activity Book.
The more difficult materials could be read by gifted and talented students and reported on to the class or they can help the teacher read them to the class. Be sure Indian culture staff or knowledgeable people from the community are involved in art projects.

ABOUT THE LITERATURE FOR PHASE FOUR –

Indian people have always been artists. Indian art is very popular in the nonIndian world and it has influenced nonIndian art.

Painting Plants, Flowers, Landscapes –

**Redoute: The Man Who Painted Flowers* by Carolyn Croll, Philomel, 1996.
**Fun with Flower Stencils* by Paul Kennedy, 1990.
**Landscapes (Start with Art)* by Sue Lacey, Millbrook Press, 2000.
**Landscapes* by Peggy King, Crabtree, 1996.

Weaving with Plants: Indian Basket Making –

Weaving: a **California Tradition* by Linda Yamane (**Indian Author**), Lerner We Are Still Here Series.
*Waw Giwulk: Center of the Basket in *Keepers of Life* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, 1998. **O'odham**
*The First Basket in *Keepers of Life* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, 1998. **Mandan**
Little Indian Basket Maker* by Ann Nolan Clark, Melmont, 1957. **O'odham
If it exists, include the basket making of local tribe(s).

Indian Pottery –

When Clay Sings* by Byrd Baylor, Scribner's, 1972. **Pueblo
Children of Clay – A Family of **Pueblo Potters* by Rina Swentzell (**Indian Author**), Lerner, We Are Still Here Series.
Little **Indian Pottery Maker* by Ann Nolan Clark, Melmont, 1955.
Helen Cordero and the Storytellers of **Cochiti Pueblo* by Nancy Shroyer Howard, Davis Pub., 1995.
If it exists, include pottery making of local tribe(s).

The more difficult materials can be read by gifted and talented students and reported on to the class or they can help the teacher read them to the class.

Working with Clay –

**Kids 'N Clay Ceramics Book* by Kevin Nierman, Tricycle Press, 2000.
**Clay Modeling with Pooh* by Laura Torres, Mouse Works, 1999.
**Create Anything with Clay* by Sherri Hoab, Klutz, 1999.

Be sure Indian studies culture staff or knowledgeable people from the community are involved in art projects.

ABOUT THE LITERATURE FOR PHASE THREE –

Indian people have always been artists. Indian art is very popular in the nonIndian world and it has influenced nonIndian art.

About Art and Artists –

**Child's Book of Art* by Lucy Micklethwait, D K Pub., 1999.
**Emma's Rug* by Allen Say, Houghton Mifflin, 1996.
**The Painter* by Peter Catalanotto, Orchard Books, 1995.
**Squeaking of Art: The Mice Go to the Museum* by Monica Wellington, Dutton, 2000.

Indian Petroglyphs and Pictographs –

**Before You Came This Way* by Byrd Baylor, Dutton, 1969.
**Stories on Stone: Rock Art, Images from the Ancient Ones* by Jennifer Dewey, 1996.
**Picture Writing of the American Indian* by Garrick Mallery.
The teacher should stress that Indian people have always been artists and these are some examples of their first art.

Indian Beadwork and Quillwork –

Quillworker: A* ***Cheyenne* *Legend* by Terri Cohlene, Troll, 1990.
The Pine Ridge Porcupine* by Ann Nolan Clark, **Lakota Books.
Where Did You Get Your Moccasins?* by Bernelda Wheeler, Pemmican Pub. **Canada

Drawing/Coloring Animals –

**Small Animals of North America Coloring Book* by Elizabeth McClelland.
**Hand Print Animal Art* by Carolyn Carreiro, Williamson Pub., 1997.
**Superdoodle Mammals* by Bev Armstrong, 1993.
**I Can Draw Animals* by Tony Tallarico, Little Simon, 1996.
The teacher should stress that beadwork and quillwork were done on animal skins and animals are often the subjects of Indian art.

Gifted and talented students should read the more difficult selections and report to the class or help the teacher read them to the class. Be sure to have the Indian culture staff or other knowledgeable people from the community involved in art projects.

ABOUT THE LITERATURE FOR PHASE TWO –

Indian people have always been artists. Indian art is very popular in the nonIndian world and it has influenced nonIndian art.

About Illustrators –

The Art Lesson* by Tomi dePaola, G. P. Putnam, 1989. **Included in some basal readers

**What Do Illustrators Do?* By Eileen Chriselow, Houghton Mifflin, 1999.

**Country Artist: A Story About Beatrix Potter* by David R. Collins, Carolrhoda, 1990.

About Art –

Legend of the* ***Indian* *Paintbrush* by Tomie dePaola, Paperstar, 1989.

The Goat in the Rug* by Charles Blood and Martin Link, Parents, 1976. **Navajo Also found in some basal readers

**The Quilt Story* by Tony Johnston and Tomi dePaola, Paperstar, 1996
These stories are included to emphasize the illustrators and to introduce other examples of art made by Indians and nonIndians.

Other Stories Including Indian Art –

.**Grandmother Spider Brings the Sun* by Geri Keams (**Indian Author**), Northland Press, 1995. **Cherokee** Includes beautiful Indian pottery.

Dreamcatcher* by Audry Osofsky, Orchard Books, 1992. **Ojibway

Grandmother's Dreamcatcher* by Becky McCain, Albert Whitman & Co., 1998. **Ojibway
These stories are included to include other items of Indian art and to emphasize what the students learned in the Sun, Moon and Stars unit.

Art Including the Sky –

**Harold's Trip to the Sky* by Crockett Johnson, Harpercollins,1981.

**The First Starry Night* by Joan Shaddox Isom, Charlesbridge, 1998.

**The Starry Night* by Neil Waldman, Boyds Mill, 1999.
Be sure to have Indian culture staff or other knowledgeable people from the community involved in art projects.

FURTHER RESOURCES FOR ART UNIT –
These materials can be used to substitute for books in the suggested unit outline or for additional reading/other activities for students.

I Spy: An Alphabet in Art by Lucy Micklethwait, Mulberry Press, 1996.

A is for Artist by John Harris, J. Paul Getty Museum,1997.

The Graphic Alphabet by David Pelletier, 1997.

Color by Ruth Heller, Grosset & Dunlap, 1995.

The Berenstain Bears Draw It by Stan and Jan Berenstain, Random House, 1996.

Drawing Lessons from a Bear by David McPhail, Little, Brown, 2000.

The Art Box by Gail Gibbons, Holiday House, 2000.

Let's Start Painting, Silver Dolphin, 1998.

Click: A Book About Cameras and Taking Pictures by Gail Gibbons, Little, Brown, 1997.

*Color Zoo by Lois Ehlert, Lippincott, 1989.

*Red Blue Yellow Shoe by Tana Hoban, Wm. Morrow, 1986.

*Picture of Harold's Room by Crockett Johnson, Harpercollins, 1960.

*Molly Draws by Levert, Annick Press, 1998.

*Farm Animals in Art, Lowell House, 1997.

*Wild Animals in Art, Lowell House, 1997.

Georgia O'Keefe by Mike Venezia, Children's Press, 1993.

Leonardo Da Vinci by Tony Hart, Barrons Juveniles, 1994.

Van Gogh by Mike Venezia, Getting to Know the World's Greatest Artists, 1994.

Michaelangelo by Tony Hart, Barrons Juveniles, 1994.

Norman Rockwell by Mike Venezia, Getting to Know the World's Greatest Artists, 2000.

Diego Rivera by Mike Venezia, Getting to Know the World's Greatest Artists, 1995.

Diego by Jeanette Winter, Knopf, 1994.

Quilt Making, Quilt Making Activity Kit by Mary Ruthsdotter, available from National Women's History Project, Windsor, CA.

The Quilt by Ann Jonas, Greenwillow, 1987.

The Boy and the Quilt by Shirley Kurtz, Good Books, 1991.

An Amish Quilt Coloring Book by Cheryl Benner, Good Books, 1994.

Magpie Magic: A Tale of Colorful Mischief by April Wilson, Dial, 1999.

How to Draw Birds by John Green, Dover, 1999.

Bird Fantasy Designs by William Rowe, Dover,1980.

I Can Draw Animals by Ray Gibson, ETC Pub.,1998.

Animals in Art by Gladys Blizzard, Lickle Pub.,1992.

Kids Can Draw Animals by Philippe Legendre, 1999.

Drawing Horses by Jeff Crosby, Grosset and Dunlap, 2000.

Spot a Dog by Lucy Micklethwait, Mulberry Books, 1995.

I Can Draw Horses by Gill Speirs, 1983.

Bunnies in my Head by Tricia Tusa, University of Texas, 1998.

How to Draw Pets by Christine Smith, Garreth Stevens, 1996.

Legend of the Red Wolf by Valerie Ozeta, Red Wolf Pub., 1999. **Indian**

Sea and Cedar by Lois McConkey, Firefly, 1973. **Northwest**

Native Artists of North America by Reavis Moore.

Navajo Visions and Voices Across the Mesa by Shonto Begay (**Indian Author**), Schol.

Rainbow at Night by Bruce Hucko. **Navajo**

Colors of the **Navajo** by Emily Abbink, Carolrhoda, 1998.

Language of the Robe: **American Indian** Trade Blankets by Robert Kapown, Gibbs-Smith, 1992.

How to Make a **Native American** Dance Shawl. Video

The Porcupine's Quills in Skunny Wundy by Arthur Parker, Albert Whitman, 1970. **Indian**

An **Indian** Artist, Read Aloud Story by Lorraine Webster, University of South Dakota, 1972.

North **American Indians** Coloring Album by Frank Fox.

Indian Designs by David Villasenor.

Lucy Learns to Weave by Virginia Hoffman, Woodside & Co., **Navajo** Curriculum Center Press.

Weaving a **Navajo** Rug by Begay Students, Chinle, AZ.

A First Clay Gathering by N. Naranjo-Morse, 1994. **Pueblo**

Star Quilt Sticker Book, Little Dover Books. **Plains**

The Star Quilt, a Symbol of **Lakota** Identity by Marla N. Powers, Lakota Books, 1990.

Simply **Seminole**: Techniques and Designs in Quiltmaking by Dorothy Hanisko.

Guide to Indian Rock Carvings of the Pacific **Northwest** Coast/Beth Hill, Hancock, 1980

The Same Sun Was in the Sky by Denise Webb, Northland, 1994. **Indian**

Indian Basketry by George Wharton James.

American Indian Beadwork by W. Ben Hunt.

There are many Indian art books for adults that contain pictures of art items.

CHECK YOUR LIBRARY OR BOOKSTORES FOR OTHER BOOKS RELATING TO THE TOPIC.
***These books are especially suitable for Phase One – for preschool children.**

ART WORDS

Beginning Sounds-

basket
buy
between
buckskin
bead
beadwork
beautiful
blue
blanket
black
brush
brown

quilt
quilter
quill
quillwork
quality
quantity

cut
color
cotton
camera
construction paper
crayon
clay
canvas
curve
complete
create
creative
circle

rug
rock art
red
rainbow
ruler
roll

design
decorate
dye
dreamcatcher
draw

fold
frame
fringe

sew
skin
stroke
star quilt
stitch
square
scissors
shape
shawl
sharp

gallery
glue
green
grass

hide
hard
harden
hang

tape
talent
tan
trace
triangle
thread
tools

view
visualize

leather
loom
landscape
line

moccasins
mold
masterpiece
museum
material
markers
measure

water
watercolor
weave
wool
white

pot
potter
pottery
paint
painting
paintbrush
palette
picture
pencil
paper
paste
portrait
purchase
Pendleton
petroglyph
pictograph
plan
prism
photograph
photographer

Long Vowel Sounds-

weave
bead
easel
dreamcatcher
paint
portrait
between
green

frame
paste
landscape
line
hide
inside
white

Exceptions-

measure
leather
thread
masterpiece

Short Vowel Sounds-

black
basket
masterpiece
grass
landscape
tan

brush
cut
rug

Compound Words-

watercolor
quillwork
beadwork
paintbrush
landscape
dreamcatcher
masterpiece
inside
outside

Other Words-

art
artist
illustrate
illustrator
yellow
orange
nice
needle
imagine

Word walls should be maintained. Instructors should ensure that students know the meanings of these words in this context and extend vocabulary by noting how they may mean other things in other contexts or they may have homophones. Experiences, pictures and illustrations should be used to explain and process word meanings. Words that rhyme with these words can be examined to extend vocabulary and to see varying spellings for sounds. Other words should be added.

SCIENCE STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN ART UNIT –

Standard – Understands the convictions scientists share about the nature of the world and what can be learned about it
Benchmarks-
Understands that science experiments normally have reproducible results: science experiments generally work the same way in different places

Standard – Understands that scientific inquiry works in particular ways
Benchmarks-
Understands that learning can come from careful observations and simple experiments
Understands that individuals can interpret the same thing in different ways

Standard – Understands basic concepts about the structure of matter
Benchmarks-
Knows that some properties of material may be changed by external actions like heating and cooling, but different materials respond differently to the same actions
Knows that when a new material is made by combining two or more materials, as in a chemical transformation, the material can have properties that are different from the original materials

Standard – Knows the forms energy takes, its transformations from one form to another, and its relationship to matter
Benchmarks-
Knows that an object in a beam of light can cast a shadow, while other objects might bend or transmit the light

Standard – Understands motion and the principles that explain it
Benchmarks-
Knows that light from the sun is made up of a mixture of many different colors of light, even though to the eye the light looks almost white

Standard – Understands cycling of matter and energy flow through the environment
Benchmarks-
Knows that some source of "energy" is needed for any work to be done

Standard – Understands the nature of physical, conceptual, and mathematical models and the uses made of them
Benchmarks-
Knows that a model of a thing is different from the real thing, but can be used to learn something about what the real thing is like
Knows that geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, and even stories can be used to represent objects, events, and processes in the real world, although these representations can never be exact in every detail

Standard – Knows about patterns of change and constancy
Benchmarks-
Knows that things change in some ways and stay the same in some ways
Knows that sometimes making up an experiment helps us to learn more about how something changes

MATH STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN ART UNIT-

Standard – Effectively uses a variety of strategies within the problem solving process
Benchmarks-
Brainstorms possible things to do
Clarifies problems using discussions with teacher or knowledgeable others
Clearly states problems in his or her own words
Checks the reasonableness of results through estimation

Standard – Understands and applies basic and advanced properties of numbers
Benchmarks-
Has a general understanding of the concept of number
Uses counting to exemplify numbers
Understands the relationship of decimals to whole numbers
Understands the relationship of fractions to decimals and whole numbers

Standard – Uses basic and advanced procedures while performing computation
Benchmarks-
Adds, subtracts, multiplies and divides whole numbers with accuracy
Adds, subtracts, multiplies, divides decimals with accuracy
Mentally adds and subtracts basic combinations of whole numbers with reasonable accuracy

Standard – Understands and applies basic and advanced methods of measurement
Benchmarks-
Understands the relationship between length, width and height
Understands the basic characteristics of area and how it is measured
Makes effective use of ruler for making measurements

Standard – Understands and applies basic and advanced concepts of geometry
Benchmarks-
Understands the similarities and differences between circles, squares and triangles
Understands the meaning of the concepts of inside/outside/between
Understands the basic characteristics of the concept of three dimensions
Understands the basic features of angles
Analyzes the effects of combining, subdividing and changing shapes

Standard – Understands and applies basic and advanced concepts of data analysis and distributions
Benchmarks-
Has a basic understanding of the concept of data
Collects and organizes simple data sets to answer questions

LANGUAGE ARTS STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN ART UNIT-

Standard - Gathers information effectively through reading, listening and viewing
Benchmarks-
Provides an accurate retelling of the basic plot of simple stories that student has read, heard or viewed
Provides an accurate retelling of the main idea of simple expository information the student has read, heard or viewed
Understands that reading, viewing and listening are ways of gaining information about the world
Determines meaning of simple words from text
Creates mental representations for concrete information read, heard or viewed

Standard – Reads and responds to literature
Benchmarks-
Understands that stories have beginning, middle and ending episodes
Understands the genre of legends and fables

Standard – Communicates ideas and information in writing
Benchmarks-
Understands basic connections between spelling patterns and speech sounds
Understands basic phonological patterns in English
Expresses ideas in simple expository forms
Composes simple stories that express cohesive ideas
Experiments with different genre as modes for expressing ideas

Standard – Understands and applies basic principles of language use
Benchmarks-
Recognizes characteristic sounds and rhythms of language
Makes valid observations about the use of words
Makes valid observations about the use of language at home as opposed to the use of language in school

Standards and Benchmarks from *The Systematic Identification and Articulation of Content Standards and Benchmarks,* Midcontinent Regional Educational Laboratory, 1994.

AMERICAN INDIAN CONTENT STANDARDS FOR PRIMARY GRADES ADDRESSED IN ART UNIT –

SCIENCE

Science As Inquiry-
Indian students should develop an awareness that observations and understandings of nature traditionally formed an essential base of knowledge among American Indian cultures.

Physical Science-
Indian students should develop an understanding of the innate properties of objects and materials that were (and are) recognized by traditional American Indian cultures in the manufacture and use of specific material objects that capitalize upon those properties.

Earth Science-
Indian students should develop an understanding of properties of earth, air, water and fire and how they served as a basis for traditional American Indian production of clothing, housing, tools, and art objects.

Science and Technology-
Indian students should develop an awareness of the problem solving skills demonstrated by historical American Indians in the development of tools and technologies such as in pottery technology – e.g. types of clay, tempering, firing techniques, decorative techniques.

LANGUAGE AND LITERACY

Indian students should be able to –

Listen for meaning and gain information from spoken English and a Native language.

Listen to Indian stories told in the oral tradition, comprehend their teachings and be able to retell them.

Speak coherently, conveying ideas in both English and a Native language.

Read fluently and independently, a variety of materials including those with American Indian themes.

Locate and use a variety of texts to gain information, for example, historical materials about their tribe, tribal legends and stories and oral history transcription.

Be familiar with children's literature with Indian themes, especially with that pertaining to the student's tribe and literature written by Indian authors.

MATHEMATICS

Mathematics as Problem Solving-
Indian students should formulate problems from everyday and mathematical situations within their home and tribal/community worlds.

Mathematics as Communication-
Indian students should relate physical materials, pictures, and diagrams to mathematical ideas utilizing beadwork, pottery, baskets, rugs, star quilts, and other items from American Indian cultures.

Mathematics as Reasoning-
Indian students should use models, known facts, properties and relationships to explain their thinking, taking objects or ideas from their own or other American Indian cultures to do so.

Estimation-
Indian students should apply estimation when working with quantities, measurement, computation and problem solving with hands-on experience in creating Indian arts/crafts items.

Number Sense and Numeration-
Indian students should construct number meanings through real-world experiences and use of physical materials drawing upon both designs from Indian artwork for examination and numerical analysis as well as manipulatives derived from Indian crafts (beads).

Geometry and Spatial Sense-
Indian students should describe, model, draw and classify shapes including tribal design, symbols and traditional structures (such as the conical shape of the tipi).
Indian students should investigate and predict the results of combining, subdividing and changing shapes such as those found in star quilt designs.
Indian students should relate number and measurement ideas by counting, measuring and performing other functions related to geometric designs found in American Indian art.
Indian students should recognize and appreciate geometry in their world especially that found in Indian arts and crafts and the significance of certain shapes, such as the circle, to Indians.

Measurement-
Indian students should make and use measurements in problem and everyday situations such as creating Indian arts and crafts.

Patterns and Relationships-
Indian students should represent and describe mathematical relationships utilizing patterns found in Indian art and design.

Example Activities Developed by Teachers of American Indian Students

Workshop on Culturally-Based Math and Science Curriculum Development
Haskell Indian Junior College
1992

MASTERS Project
Math and Science Teachers for Reservation Schools
University of Kansas and
Haskell Indian Nations University
Earth's Caretakers, 1993

Ideas should be adapted for appropriateness. See appendix for how to order Earth's Caretakers.

MATH --

"NATIVE AMERICAN BASIC DESIGNS"

CULTURAL OUTCOME: IX
MATH OUTCOME: I

CULTURAL OBJECTIVE:

Students will learn to recognize geometric shapes that have spiritual and artistic importance to their tribe.

MATH OBJECTIVE:

Students will match, sort, and classify shapes and objects.

TEACHER'S BACKGROUND INFORMATION:

Native Americans use geometric shapes in beadwork, paintings, headdresses, shields, and clothing. Each tribe has special designs which have particular significance to them.

The first beads were painted. The Indians used colored earth, clays, rocks, plants, and bark for their dyes, which were dried, pounded and ground into a fine powder. This powder was mixed with water or animal fat to make paint.

Beads brought by European travellers became popular with many tribes, these beads gradually replaced the porcupine quill in popularity of use. The Woodland People used floral designs in their embroidery, while the Plains Indians worked with geometric designs. The Crow and Blackfeet Indians combined both types of design in their work.

Many Indian tribes used similar combinations of geometric shapes to signify some meaning. Some of these include the trees, lightning, animals, stars, people, rivers, mountains, birds, clouds, etc. They are carved, beaded, painted, constructed, or quilled onto many clothing items, headdresses, rugs, tepees, blankets, quilts, riding gear, baskets, totem poles, pottery, baskets, and moccasins.

The Papagos (Tohono O'odham) make baskets with a number of different designs. Papago baskets are made from yucca leaves, devils's claw, willow branches, and bear grass. The designs are usually colored black, red, green, and white. The green leaves of the yucca can be bleached white in the sun.

STUDENT LEARNING ACTIVITIES:

1. Students will go on a field trip to find yucca leaves, devil's claw, willow, and bear grass. Put these in bags to preserve them until the class returns to school. Discuss size and color and relate them to the construction of baskets. Let them dry and later construct a basket.

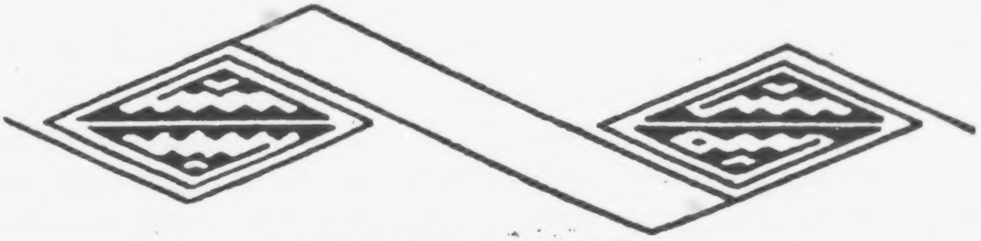
2. The teacher will show the class some samples of baskets with interesting designs. The students will draw six circles on their paper and then draw some designs that they see in the baskets. Discuss the colors, how many colors, and shapes in the design. The teacher will display the circles after they are cut out and pasted on a contrasting background.

3. The students will match cut out shapes of the circle, square, triangle, rectangle and diamond.

4. The students will trace around templates of shapes on paper and then combine different shapes to make recognizable objects. Have them tell about their picture. The students will then cut out shapes to color and make designs.

5. The teacher will make a large circle with masking tape on the floor. The students will then work on motor development skills - walk, crawl, hop, skip, or hop in and out, etc. Check these skills off to show improvement in development.

6. The students will trace a design in sand with finger or stick, using basic shapes. Tell about how it feels, what shapes are drawn, and how to make a design using two shapes, increasing it to more as child's ability progresses. This may also be done on the chalkboard.



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WEEK-LONG UNIT ACTIVITIES:

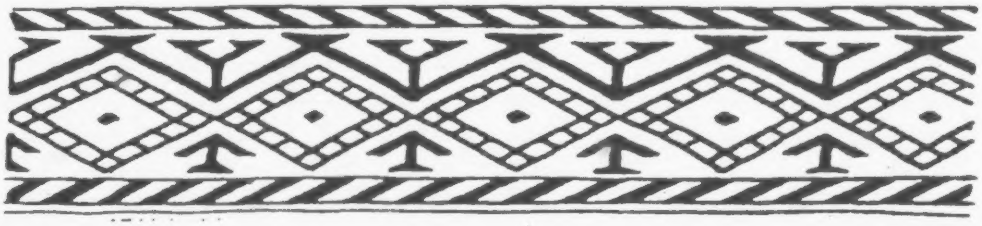
1. The teacher will place a large circle on chalkboard or story paper. The class will discuss what a circle means to each child and his/her tribe. Review the letters and words E (East), S (South), W (West), and N (North). The students will show and turn their bodies to face that direction. They will place the capitol letters on the correct spot on the board or paper and in the classroom. The teacher will place this in the room or on the bulletin board which has pictures of circle designs in Indian crafts.

2. The teacher will pass out geoboards and one rubber band to each student. Students will experiment and explore various placements of the rubber band, with the teacher noting whether any of them make the basic shape patterns. Handout the shapes you have discussed in earlier activities for the whole group to duplicate. Experiment with one child describing to another child where to place his/her rubber band. The teacher will encourage them to use the four directions. If this is too difficult, the teacher may give the directions to the whole group or small groups. Add more basic designs of art work to the bulletin board.

3. The students will use geoboards to create designs with two rubber bands. Draw a picture of one or two designs on the board. Let the children continue to explore with designs. Have them count the pegs between the rubber bands and then color that many squares on the large scale graph paper using different colors for each rubber band.

4. The teacher will give the children a 9" square of beige cotton material, have them draw one of their favorite designs made earlier, and color with tri-chem paints. The teacher would combine all of these into a wall-hanging for the classroom.

5. The teacher will display the finished work and save for an art show or a gift for a parent or guardian.



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6. Making a Pattern:

   a. Read The Quillmaker aloud to the students.

   b. Discuss "quilling"–using naturally dyed porcupine quills for ornamentation instead of beads. They can be used for earrings, medallions, or belts.

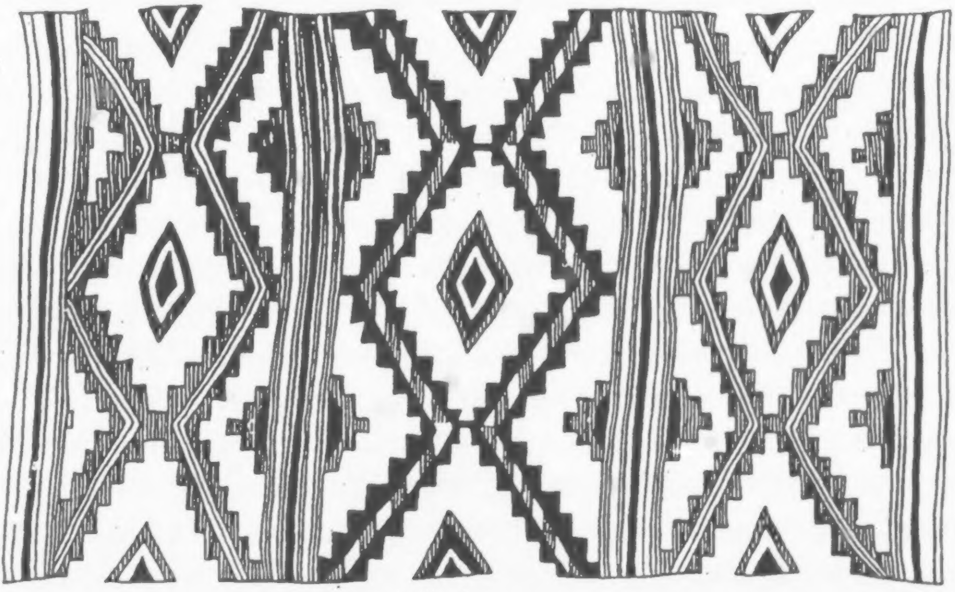
   c. Using colored tooth picks to represent quills, the students can make patterns on strips of paper.

   d. The teacher can discuss the star quilt used for "memorial ceremonies" and other ceremonies. They also serve as a way of making a living for many people.

   e. Have an elder or person of the community show in a simple way how they make a star quilt.

   f. In a group, plan how to make a simple quilt using construction paper. Follow through and make one.

7. The students will make a bulletin board with the same design with different colors. They will place cards of the four directions on the proper location on the bulletin board. The students will make a colorful border with various geometric shapes.



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EVALUATION:

The students will color from basic design sheets two or more designs on large scale graph paper. Using two or three colors and designs, the students will make a book mark or cover to a design book.

RESOURCES:

Terri Cohlene, The Quillmaker. Vero, California: The Raurle Corp., 1990.

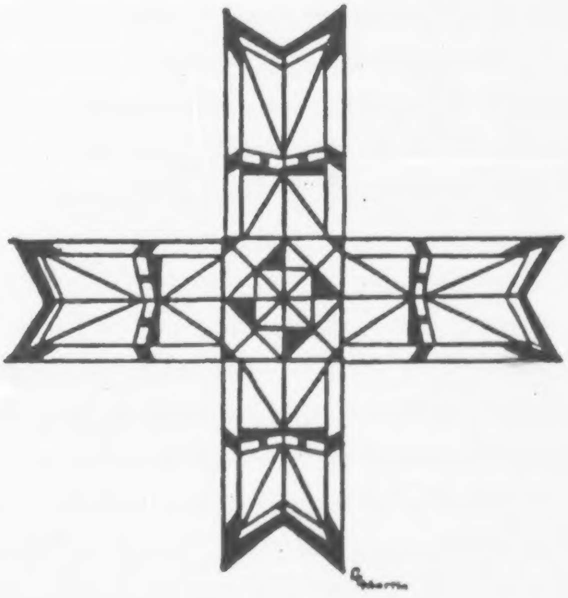
Dobyns, Henry F., The Papago People, Phoenix Arizona: Indian Tribal Series, 1972.

Hofsinde, Robert, Indian Beadwork, New York: William Morrow and Company, 1958.

Lyford, Carrie A., Quill and Beadwork of the Western Sioux. Boulder, Colorado: Johnson Publishing, 1979.

DEVELOPED BY:

Carol L. Martin
Mary Stonehouse
Georgie Riley



SCIENCE --

"SKINWORK"

CULTURAL OUTCOME: II
SCIENCE OUTCOME: III

CULTURAL OBJECTIVE:

Students will learn how Native Americans prepared animal hides for clothing and shelter.

SCIENCE OBJECTIVE:

Students will learn how plants and animals are used to enhance our lives.

TEACHER'S BACKGROUND INFORMATION:

Indians used their environment in an ecologically sound manner. Every bit of skin was used. Everything not used in the larger garments was utilized for moccasins, pouches, and other small items. The smallest pieces were used for fringe.

Manifesting their respect for life, Native Americans found ways to use every part of the animals they killed. The skins were used to make clothing, tipi covers, shields, masks, and boats. Skins were often used as containers to hold paints, foods, medicines, and infant blankets.

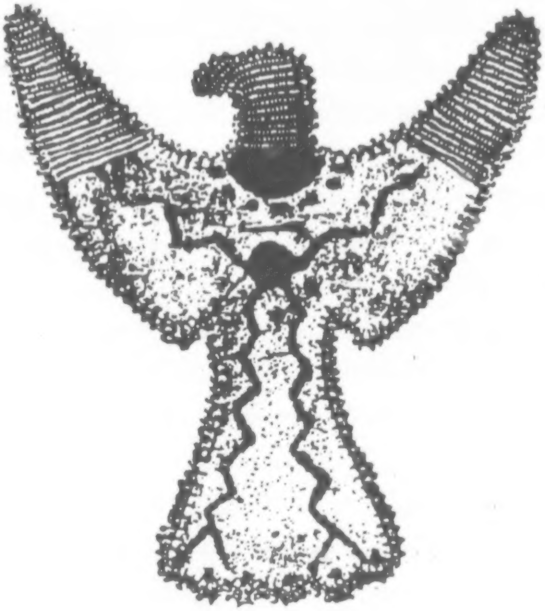
The preparation of animal skins was not an easy task. The skins had to be treated or else they would become hard and stiff. They were prepared by first removing the animal flesh with rock scrapers, then rubbing an oily paste of brains and liver on the hide and soaking it in water for several days.

Shields were made from tough pieces of hide stretched over frames. Many of the shields were decorated with religious symbols to protect the user. Moccasins, worn by many tribes, were made of various types of skins. The styles were many and varied as a result of climate and local terrain. During the winter, moccasins were often stuffed with fur and grass for warmth.

Other types of clothing made from hides included leggings, shirts, dresses, robes, and tipis in the hunting tribes. Skins were essential to the daily lives of the Native Americans.

STUDENT LEARNING ACTIVITIES:

1. Invite an elder to demonstrate the uses of hides. If time permits, ask the visitor to demonstrate tanning leather. (Due to time factor this might be illustrated in picture form.)



EVALUATION:

1. Post an art display of items created by the students.
2. Ask students to describe their creations.
3. If possible, videotape the visit from the elder and evaluate the student reactions to the material being presented.

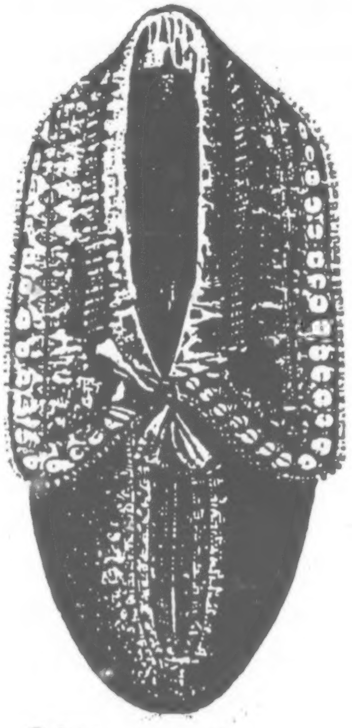
RESOURCES:

Whiteford, Andrew. North American Indian Arts.

American Indian Tribes of the Southwest. Huntsville Alabama: Madison County Title IV Project, 1987.

DEVELOPED BY:

John Wray



MATH AND SCIENCE --

"WEAVING MAGIC"

CULTURAL OUTCOMES: V, VII
MATH OUTCOMES: I, II, VI
SCIENCE OUTCOMES: II, III, V

CULTURAL OBJECTIVE:

Students will appreciate and recognize the craft of weaving and the ways in which it relates to tribal traditions and income.

MATH OBJECTIVES:

Students will:

when given patterns, make generalizations and predictions by determining the rules.

translate real life situations involving addition and/or subtraction into conventional symbols of mathematics

identify coin values and count coins

measure lengths using non-standard units, centimeters and inches.

SCIENCE OBJECTIVES:

Students will:

use observation and classification skills

communicate by using basic scientific vocabulary

utilize prediction techniques

classify things as living or nonliving.

TEACHER'S BACKGROUND INFORMATION:

The picture book, The Goat in the Rug, by Charles C. Blood and Martin Link, uses the character of a goat to tell about the process of carding, dyeing and weaving a rug through the use of her wool. The story is written at a level that a second-grade student can easily understand.

STUDENT LEARNING ACTIVITIES:

MATH

1. Provide a ball of yarn and a container of dye. Give each item a set price. Have the students add or subtract the cost of the materials to make a rug.

2. Have the students practice weaving by using contrasting color construction paper using an over-under pattern.

3. Once the students understand the pattern, have them create their own "rugs" in patterns of their choice by using cardboard or plastic meat trays, balls of colored yarn, and tape:

   a. Wind the yarn at one inch intervals on the tray

   b. Tape the ends down

   c. Begin weaving over and under until making a strand about an inch wide

   d. Estimate the number of strands in an inch

   e. Count the number of strands in an inch-wide "rug"

   f. After completing the rug, compute the total amount of yarn that was used and the total cost of all materials.

STUDENT LEARNING ACTIVITIES:

Science

1. Compare living and nonliving beings in the story and chart the students' answers.

2. Locate the plants used in the story and predict what colors each plant will produce.

3. Identify the parts of the plant (stem, leaves, roots, flower and root hairs).

4. Make dyes from the following plants: juniper, rabbit brush, yucca, dock, wild onion, cliff rose and sumac. Note that each plant uses a different part to produce its color:

Juniper	leaves
Rabbit Brush	flowers
Yucca	root stems
Dock	roots
Wild onion	bulbs
Cliff rose	leaves and stems
Sumac	roots, twigs, leaves and berries.

5. Use the following method to make the dyes:

   Boil water and add the plant or plant part into the boiling water. Let it boil until the water has turned a shade darker than the desired color. The time will vary depending upon the color and type of plant used. Each plant should be boiled in a separate container.

For plant dye preparation refer to Navajo Native Dyes, by Nonabah G. Bryan. Palmer Lake, Colorado: Filter Press.

EVALUATION:

1. Calculate the profit margin involved in making a medium-sized wool rug, by answering the following questions:

   How much do the materials cost?

   How much time does it take to produce a rug?

   How much does a rug sell for in local markets?

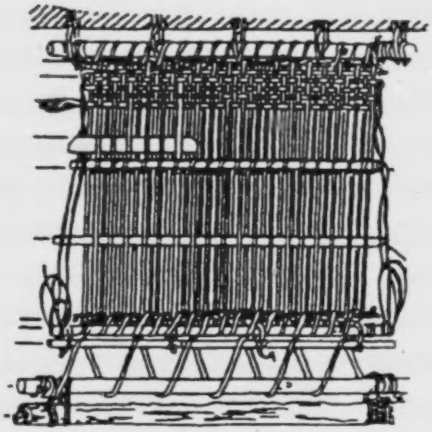
2. Label the plant parts, with the use of actual plants, photographic illustrations, or plastic models.

RESOURCES:

Blood, Charles L. and Link, Martin. The Goat in the Rug. New York: Aladdin Books, 1990.

DEVELOPED BY:

Arlene Valenzuela
Bonnie McGinnis



291

MATH AND SCIENCE --

"BEAUTY FROM THE EARTH: NAVAJO NATIVE DYES"

CULTURAL OUTCOMES: VI, VII
MATH OUTCOMES: IV, VI
SCIENCE OUTCOME: II

CULTURAL OBJECTIVES:

Students will understand that:

weaving is an important art within the Navajo tribe

Native Americans make use of local plants and minerals in producing the dyes for the wool.

MATH OBJECTIVES:

Students will:

measure the length and weight of objects by using metric and standard units of measure

identify shapes and figures by name

recognize elements of similarity, congruence, and symmetry of simple concrete objects or models

identify line segments, intersecting lines, and parallel lines.

SCIENCE OBJECTIVES:

Students will:

gather information

understand and apply information and concepts

understand the cause and effect relationships.

TEACHER'S BACKGROUND INFORMATION:

In the Navajo legend about Spider Woman from Our Friends the Navajos (p.10), Spider Woman teaches the First Woman how to weave on a loom that Spider Man had explained how to build. After reading this legend to the class, discuss its importance and meaning. Refer to the legend "The First Spinner" adapted from Waterless Mountain, (p.33-35):

Spider Woman teaches the First Woman the art of dyeing. The old women who weave in this story believe that Spider Woman must be remembered, and tribute paid to her, for teaching The People how to weave. It is said that if one does not give her credit for her knowledge, Spider Woman will spin webs in the head of the weaver, who will lose much of her knowledge, intelligence, and wisdom. One of the ways to pay tribute to Spider Woman is to leave a small hole or "Spider Hole" in the weaving.

Many people believe that the Navajo learned the art of weaving from the Pueblos. If this is true, then they have excelled much further in the art than their masters have to date. The Navajos have been the least influenced by the Europeans and have created an art unmatched by any other tribe.

Most Navajos use wool from their domestic sheep. The wool is washed after it is sheared. They "card" the wool (combing it with hand cards). To spin the wool, they use a tool called a spindle which is a slender stick inserted through the center of a round wooden disc.

Navajos use native plant dyes to color wool. These native plant dyes are made by using plants and minerals easily found in their native land. The colors that can be produced by these plants and minerals range over many shades of yellow, black, brown, rose, tan, gray, pink, and orange. A good shade of green was not attainable through natural materials.

In preparing plant dyes there are no exact measurements used, just approximate ones. Cactus fruit, plants, and bark are measured in pans, Sumac and Navajo Tea are made in rolls, and rugs are measured in hand-lengths.

The colors and shades produced by plants vary depending upon local soil conditions, weather and the seasons. Alum is added in some preparations when dyeing the wool to help intensify the color. This mineral (an aluminum salt) is found in the form of soft white chunks and is collected from under rocks in flat areas where there has been recent water evaporation. Alum forms crystals like table salt and is also used in industry for making cosmetics, dyes, in baking powders, crunchy pickles and leather tanning agents.

STUDENT LEARNING ACTIVITIES:

1. Invite a grandmother with weaving experience to come to the class and talk to the students about the dyeing and weaving processes. Invite an elder or special visitor to show several plants that can be found in the area. This information will be important for a field trip. Have the person explain when the plants are available for collecting.

2. Take the class on a field trip near the school and divide them into groups. This is necessary since you will need to collect plants and minerals for the Dyeing Activity. Explain to the students how much of each item is required and have them approximate that amount when the item is in a paper sack. Remembr to use smaller quantities of fresh plants than dried plants to produce a given color.

3. Spin wool with a spindle and roll into large loops so it can be put into the dyes. This wool will be used later when the students create their own weaving on the loom.

4. Prepare dyes from the plants listed on the chart at the end of this lesson and throw the chunks of alum on hot coals or a pan until they start to foam; then drop into the dye bath.

5. Have the students design a simple pattern, either with the bead frame or on paper. Copy the design so that the students can try different color patterns to see which one they like the best.

6. Make a simple loom and use the yarns dyed in class to create a weaving. Allow at least one hour to do the weaving. If the students are unable to finish during the project time, allow the students to work on it during free time, recess, and before and after school.

   The following materials are needed for each student:

   - needle
   - scissors
   - ruler
   - pencil
   - 2 sticks or twigs
   - kitchen fork
   - stiff cardboard (9" x 12")
   - warp string (wool spun or cotton string)
   - yarn (wool spun or store bought)

   a. Cut the piece of cardboard at each end with small slits about 1/4" apart and about 1/2" long. These slits will hold the warp in place.

   b. Attach the yarn through to the cardboard with a knot around the first slit.

   c. Pull the yarn across the loom to the opposite notch on the other side of the cardboard. Loop the yarn around the small tab and go through the next notch. Continue doing so until the loom has been threaded and tie off the yarn with a knot.

   d. Begin weaving the pattern that the students designed during the previous lesson. Remind the students not to pull the yarn too tightly at the edges when they go back and forth. If they do, their weaving will pull in towards the center. Be sure that the students understand that each row of yarn must fit tightly with the one above it.

   e. When it is necessary to change yarn, leave about 2" hanging on the edges so that students can weave them in later. This will be done after the weaving has been taken off the loom.

   f. When the weaving has been completed, remove it from the loom. Bend down the tabs, carefully, one side at a time. Slide a stick or twig through the loops of the yarn at each end.

   g. Display the weavings in the classroom. Have the students compare their design with the finished product.

7. Let the students use a bead frame for counting by 1's, 2's, 5's, etc. Have the students use them to figure out certain problems that you have distributed to the class or have put on the chalkboard.

(Adapted from Learning Mathematics - A Program for Classroom Teacher.

RESOURCES:

Our Friends - The Navajos. Papers on Navajo Culture and Life. Tsaile, Arizona: Navajo Community College Press, 1976.

Armer, Laura (Adams). Waterless Mountain. New York: David McKay and Company, 1963.

Mathews, Washington. Navajo Weavers. Palmer Lake, Colorado: Filter Press, 1968.

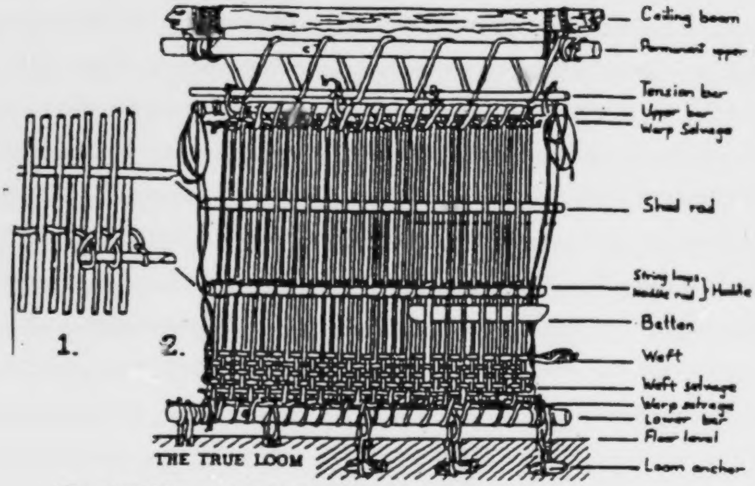
Navajo Native Dyes: Their Preparation and Use. Palmer Lake, Colorado: Filter Press, 1978.

McKeown, Ross. Learning Mathematics A Program for the Classroom Teacher., Portsmouth, New Hampshire: Heinemann, 1990.

DEVELOPED BY:

Diane Cleveland
Renata Griego
Elaine Hendricks

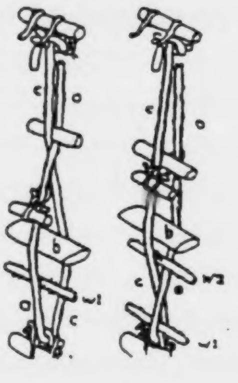
The Art of the Navajo Weaver



Ceiling beam
Permanent upper bar
Tension bar
Upper bar
Warp Selvage
Shed rod
String loops
heddle rod
Heddle
Batten
Weft
Weft selvage
Warp selvage
Lower bar
Floor level
Loom anchor
1.
2.
THE TRUE LOOM

The vertical loom, rigged for plain weave. (1) Detail showing the rigging of string loops to the heddle rod. (2) A diagram of the loom and its working parts. (3 and 4) Diagrams illustrating the functions of shed rod and heddle in changing sheds. Only two warps, c and o, are drawn in. These represent, respectively, the even-numbered and odd-numbered warps. The shed rod passes behind c--or behind all the even-numbered warps (2, 4, 6, 8, etc.) Heddle loops clasp o, or all odd-numbered warps. In diagram 3 the heddle is shown pulled forward, and the batten, b, inserted behind o and turned sideways to open the shed for the first weft, W1. In 4 the shed rod is shown forced down against the heddle loops, and the batten holding open the shed thus formed. The second weft, W2, is in position.

Loom drawings by
Frances R. Raynolds and Malcolm Withers



c
o
b
w1
c
o
b
w2
c
w1

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One Artist's Journey

Beverly Nelson

Following the Footsteps of Virgil James

As a boy, Virgil James lived with his mother and his grandfather, a Methodist minister, in the church parsonage. His grandfather would take him into the woods and study the Bible while Virgil played. When Virgil was five-years-old, a visitor in his home took the time to show him how to draw a semi-trailer truck. He was enthralled with his newly found talent. As a preschooler, his enthusiasm and delight could not be bound. He drew on everything -- even the church walls. When his mother made him stop, he would lie on the floor underneath the church pews and draw on the underside of the wooden seats.

Virgil James, a full-blood Choctaw, was born and raised in southeastern Oklahoma. He spent much of his time outdoors fishing and hunting, but two incidents made him rethink his desire and reasons for hunting. The first happened while hunting behind his house one day. His rifle didn't seem to be working correctly. Usually a good shot, he aimed, but wasn't able to hit anything. He kept shooting toward a squirrel and kept missing. He sat down to check his rifle and the sight. While sitting under the tree, he saw the squirrel that he had been trying to shoot go to its nest. He then saw that it was bringing food to a nest full of baby squirrels. To his amazement nothing was wrong with his gun.

The second incident happened after he had grown to be a man. Virgil had taught his son never to shoot at a nest. One day he ignored his own rule. He saw a bushy tail over the side of a nest and thought it was a squirrel. He shot at the tail and wounded the animal -- a raccoon. Unfortunately, he wounded, but didn't kill, the animal. He had to shoot the animal again to end its misery. Virgil continues to take his gun on hikes to explore the woods, but he doesn't kill anything. He just enjoys the pleasure of being outdoors.

As a teenager Virgil attended vocational school in Tahlequah, Oklahoma. He considered himself to have a rebellious spirit because of the many times he would run away from school to return home, approximately 170 miles away. After hitchhiking all that way, his mother would send him back each time. She didn't punish him, but she would tell him the value of getting an education. After the second year of doing this, returning to school became embarrassing to him and he realized that he was responsible for his own actions. If he were going to get an education, he would have to do it himself.

His high temper and rebellious spirit lengthened his stay in school. It took him five years to graduate simply because he would not complete his school work. He eventually began to study and finish his assignments. He graduated near the top of his class. It was during this time that his interest in drawing was revived. While taking a painting course, he entered a painting in a contest and was awarded "honorable mention."

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After graduation, Virgil attended Haskell Indian Institute in Lawrence, Kansas, for five months to learn the trade of printing. He still had a desire to attend art school but wasn't able to afford it. The GI Bill offered financial assistance to attend school for people who joined the military service. Virgil enlisted in the Navy for four years. During those four years he gained valuable experience drawing illustrations and printing. After the service, he worked as a printer and lithographer while attending more art classes. He also worked as an airbrush and product illustrator for an advertising agency. Virgil's strong desire to become a free lance artist and run his own business kept him returning to school to further his education.

Virgil now has over 25 years experience as a commercial artist, with 18 of those years as a free lance artist. During his years as a free lance artist, he had the opportunity to work on advertisements that appeared in *Look, Life, Ebony, National Geographic*, and the *Wall Street Journal*.

Virgil feels commercial art is involved in everything. People are needed to design everything from food containers to lettering on boxes. Virgil uses a variety of methods to draw, design or illustrate objects or lettering used in advertising. Virgil likes to work in most art mediums. He enjoys water color, charcoal, pencil, and painting.

Only a few years ago after an eye examination, Virgil discovered that he is partially color blind. His blindness is especially pronounced when he works with grays and graduated shadings of some colors. He doesn't feel color blindness is a handicap. He doesn't let it bother him in any way and continues to draw and paint based on his perspective of reality.

When working on a project, many times Virgil worked with clay, making a mockup of an object, or simply reducing or enlarging a design. Virgil kept a time sheet to record the time he spent on his work projects. He got so experienced he could look at a job and determine almost exactly how much time it would take and how much it would cost to make.

Once again, he returned to school for more training in the fine arts. He went to the Institute of American Indian Arts in Santa Fe, New Mexico. There he learned about painting, pottery making, and sculpting. In addition to art studio classes, he also took a variety of courses including history, English, and art appreciation.

While in Santa Fe attending the Art Institute, he was introduced to the art of traditional pottery making. Although he says that it's more painstaking and difficult, he respects the methods our ancestors used to make pottery and the beliefs and values of our oneness with nature. Pottery comes from the earth. It is made with clay, painted with minerals and plants, shaped with stones and gourds. As the Pueblo artists in Arizona and New Mexico take pieces of the land and make pottery, they feel this creates a bond. Traditional potters speak of including the whole universe—the earth, the sky, and human beings—into the design of the pottery. Pottery making is so ancient that archaeologists spend much time analyzing pottery fragments, or potsherds. The pottery remains offer a glimpse of the culture.

Virgil's voice is reverent when he speaks of pottery making. Clay is "picked" and is considered a gift from Mother Earth. Offerings of corn meal are given by some tribes, asking permission from Mother Earth to use her body for pottery to support themselves and their

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children. Much time is given to processing materials for potting. It may take twenty-four to thirty hours of work to mix one cubic foot of clay. Clay must be dried before it is soaked, sometimes ground and sieved clean. Water is changed several times to purify and dissolve stray minerals. Once saturated, the clay must be sieved to sift out the impurities of stones, branches, and roots.

Adding a temper of sand, finely ground rock, or potsherds helps the clay to dry more slowly and more evenly. There is an art to deciding the proportion of temper and clay. Next is shaping and scraping the clay to rough out the form of the object. There are many methods and techniques to pottery making. But potters, including Virgil, believe the forms and designs are a part of you. Your story or feelings or how you view your world will be evident in your pottery.

Virgil enjoys life and feels everyone should enjoy whatever they do, that one shouldn't hold back emotions, talents or feelings but be aware of one's self and one's feelings. He feels one should always be honest with one's self and others. He also believes in respecting others with the same respect he would like. He believes his feelings, emotions and attitudes cannot be hidden from painting or molding clay. As far as his work is concerned, he doesn't settle for less than his best.

Discussion Questions:

1. What kind of person do you think Virgil James is? Justify your comments based on the profile information.

2. How can you tell Virgil enjoyed drawing as a young child?

3. What thoughts do you feel Virgil had after the two hunting incidents that made him change his mind about hunting to kill animals?

4. What caused Virgil to remain in vocational school an extra year?

5. Virgil's mother did not punish him when he ran away from school, she just talked to him and sent him back. What were other ways she could have handled this? Name at least two, and tell what you think the outcome would have been regarding Virgil's life and attitude.

6. Why did Virgil finally decide to stay in school and work hard?

7. What was Virgil's reason to enlist in the military service?

Illustration on page 53: Petroglyphs (carvings on rock) from locations in the Southwest. These marks were made by ancient peoples.

Language Arts

How Can Clay Sing?

Objective:

Students will gain insight into the world of pottery long ago by reading Byrd Baylor's *When Clay Sings*.

Material:

- book: *When Clay Sings* by Byrd Baylor. New York: MacMillan, 1987. ISBN 0-689-71106-9.

Exploration:

Prior to reading the book aloud to students, discuss the title of the book.

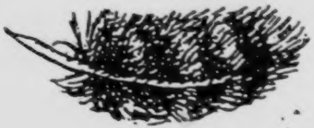
Suggested Questions:

What does the author mean?
What do think the author is going to tell us about clay?
Can clay really sing?

Seminar and Invention:

Discussion questions after reading the book:

1. Where does the story take place? What is the climate?
2. How long ago is the author talking about?
3. Did the things in the story really happen? How do you know?
4. Why did the parents tell their children to "treat the pottery piece with respect, because it is old?"
5. How can clay (or any object) be "a piece of one's life?"
6. How do you think the colors were chosen by the illustrator for the book?



7. Why do you think the people who made the pottery left so much of it remaining for us to find? Do you think they thought about leaving the pottery for us or is it simply accidental that we have found the pottery?

8. What did people paint on their pottery? Have designs on pottery changed from that time?

9. What kind of bugs does the author say there were then?

10. What is the author suggesting when she says the women spoke to the Earth as they took the clay? Why would the women do this?

11. What three words did the author use to describe the process of making pottery?

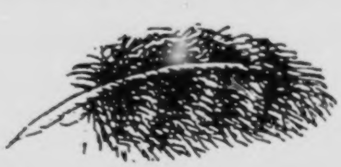
12. What can you tell from the book about the people who made pottery long ago? What was their world like?

13. How can you tell the children of that time were like the children of today?

14. What do you think the author means when she says "songs had to be powerful. . . ?" When/where do we have those type songs today?

Application Extensions:

1. Ask students if they have an item in their home (that belonged to another person) that their parents consider very precious? Discuss why it is considered valuable to the family? What meaning or significance does it have? Is the item valuable because of how much it cost or because it is important to one or more members of the family?
2. Tell students there are people who study other people through the things they used in the past. Discuss the term "anthropologist." Why is this career important and what can we learn from the past?
3. Discuss family life and the things they do together that "holds life together" as mentioned near the end of the story.
4. Make water color paintings of the Southwest area.
5. Invite a potter to class for a demonstration.
6. Research clay designs and their meanings, past and present.



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Science

Dirt or Clay?

Objective:

Students will learn to distinguish between dirt and clay.

Students will list at least one physical characteristic of clay.

Students will learn to recognize several Native American tribes that create pottery.

Materials:

- dirt
- clay
- empty coffee cans
- newspapers
- water
- notebook
- plastic bags

Exploration:

In order for clay to be "picked" as in the profile, one must be able to recognize clay and distinguish its characteristics from other substances in the earth.

After dividing students into groups of no more than four students each, hand out plastic bags labeled Bag 1 and Bag 2. (Bag 1 has dirt and Bag 2 has powdered clay.) Have each team appoint a student recorder to record team responses as they answer questions about each bag.

Suggested Questions:

What are the physical characteristics of Bag 1?
What are the physical characteristics of Bag 2?
How are the two bags different? . . . alike?

Each team is to record the responses for that group. After those responses have been recorded, teams will add water to each bag. Coffee cans may be used for this step if desired. Be sure to label coffee cans correctly, Bag 1 or Bag 2. Again members of each team will discuss and record the characteristics of each Bag/Can.

Seminar:

Teams will report their findings to the class. Questions groups might ask include:

What was the color before and after the water was added? What was the texture before and after the water was added? What was the weight of each when dry versus wet?

What was the texture before and after? Which bag had dirt? Which bag had clay?

What were the reasons for their decision?

Invention:

Students have determined the difference between clay and dirt by observing physical characteristics. Another word for the texture of clay is **plasticity**. They have collected and recorded data after making a hypothesis or proposing an explanation based on a set of facts. They have also realized that when a body of clay does not have plasticity, it is called **short**. Native American potters in the past used this procedure in order to decide the material with which to make their pots. Many potters today continue to select clay in this way to make pottery.

Suggested Questions:

Discuss the importance of pottery in certain Native American tribes.

Discuss the traditional uses and the use of pottery today.

Ask the Native American students in your class if their tribe makes pottery -- did they historically?

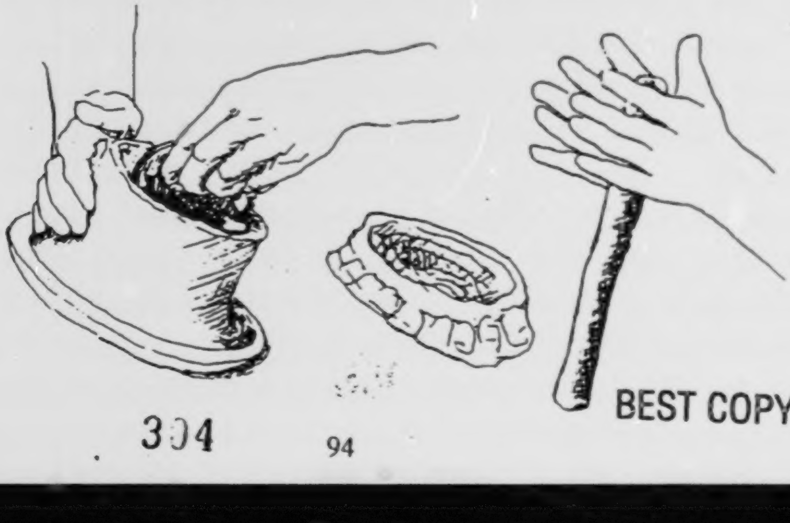
What process was used? Who were the potters? Who are the potters today?

Students might also discuss how farmers could tell when dirt was good for growing their crops?

How can differences in soil content determine where we live, grow our food, or build our homes?

Application:

Give the students two new bags of earth. Let them determine which bag contains earth that would be better suited to making pottery.



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My Ideas for Art Unit:

LESSON PLANS/SCHEDULE FOR ART UNIT:

Earth, Air, Water & Fire

TEACHER'S/PARENT'S BACKGROUND INFORMATION –

Mankind Affects Mother Earth

This unit is about earth, air, water, and fire, the four elements or sometimes referred to as the Four Ancestors by Indian people. These four elements are gifts and must be used and treated with respect. Consider the following attributed to Chief Seattle:

> Every shining pine needle, every sandy shore, every mist in the dark woods, every clearing and humming insect is holy in the memory and experience of my people. Teach your children what we have taught our children, that the Earth is our mother. The rivers are our brothers, they quench our thirst and feed our children. The air is precious to the red man, for all things share the same breath – the beast, the tree, the man, they all share the same breath. And what is man without the beasts? If all the beasts were gone, men would die from a loneliness of spirit.
>
> This we know. The Earth does not belong to man; man belongs to the Earth. Man did not weave the web of life, he is merely a strand in it. Whatever he does to the web, he does to himself. All things are connected like the blood which unites one family. All things are connected.

The four elements, all natural resources, react with one another and in this way are interrelated and interconnected. All natural resources are connected.

We cannot keep dumping waste in the oceans, rivers, and on our land. Disposal of garbage is a critical environmental issue in our society today. Every day each one of us generates nearly four pounds of trash. Much of this waste ends up in our landfills. Nearly 50% of the waste system is composed of recyclable materials. By reusing objects before throwing them away, composting, and recycling, everyone can significantly decrease the amount of waste sent to landfills.

Each day more and more waste is sent to landfills. Landfills are quickly filling up, and it is becoming very difficult to find new landfills because nobody wants a landfill in their "backyard." It costs a lot of money to get rid of garbage and the environmental cost is very expensive, too. Once the land has been used for a landfill, it can't be used as a site for public housing, for example.

Because of human intelligence and our ability to alter the earth, we are unique among living things in being powerful determiners of the global environment. In our hands rests the responsibility to preserve the life-sustaining power of the earth – our home that gives us everything from drinking water to the ephemeral beauty of a dew-covered flower petal glistening quicksilver in the morning rays of sunlight.

North American Indian stories can help us learn how to care for the earth. Through their combined knowledge we can help children discover their own roles in maintaining this fragile balance for themselves and all living things in the generations to come (Bruchac and Caduto, 1989). Mother Earth is our home and we, her children, must endeavor to preserve her resources for our future generations.

The respect for Mother Earth is rapidly fading in today's society. We ignore the crucial importance of recycling and the importance of preserving our resources. About 20 countries are currently water-scarce or water-short. The number is to double by 2020 (United Nations). The need to recycle and care for Mother Earth has to be taught to all ages and to all mankind.

-1994 Math/Science Workshop, Haskell Indian Nations University

This unit might be conducted around the time of Earth Day.

SUGGESTED PRIMARY UNIT OUTLINE-EARTH, AIR,WATER, FIRE

Reading, Language Arts, Science, Math, Art, Values	**Literature -Week 1**	**Literature – Week 2**
P Air Words	*If We Could See the Air* by	Gluscabi & the Wind
H Reading Nonfiction	David Suzuki	Eagle and Spring
A Summarizing/Reporting		Defeats Winter in
S Reading Legends/Fables	*Air Is All Around You* by	*Keepers of the Earth*
E Retelling/The Oral Tradition	Franklin M. Branley	by Caduto/Bruchac
Reading Fiction and Poetry		
F Science of Air	*Air* by Andy Charman	*The Wish Wind* by
I Charting Temperature		Peter Eyvindson
V Making Kites	*Air* by Cathy Poth	Strange Wind – Shel
E Appreciating/Respecting Air		Silverstein
P Water Words	*Snail Girl Brings Water* by	*Water* by Frank
H Reading Legends/Fables	Geri Keams	Asche
A Retelling/Responding		
S Reading Nonfiction	How Thunder and Earthquake	*Water-What It Is and*
E Summarizing/Reporting	Made Ocean, The Hero Twins	*What It Does* by
Science of Water	and the Swallower of Clouds	Judith Seixas
F Gathering Data on Water	& Koluscap and the Water	*I Am Water* by Jean
O Water Safety/Parents	Monster in *Keepers of the*	Marzollo
U Making Boats That Float	*Earth* by Caduto & Bruchac	*The Water Cycle* by
R Appreciating/Respecting Water		Helen Frost
P Fire Words	Loo-Wit, the Fire Keeper in	*Arthur's Fire Drill* by
H Reading Legends/Fables	*Keepers of the Earth* by	Marc T. Brown
A Retelling/The Oral Tradition	Caduto and Bruchac	
S Reading Nonfiction	*Nanabosho Steals Fire* by	*Stop, Drop and Roll*
E Summarizing/Reporting	Joe McLellan	by Lyn L. Hester
Good/Bad of Fire		
T Fire Safety	*Rainbow Crow: A Lenape*	*I Am Fire* by Jean
H Practice Stop, Drop, Roll	*Tale* by Nancy Van Laan	Marzollo
R Home Fire Drills/Time		
E Making Fire Safety Posters	*Fire Race: A Karuk Coyote*	*Home Fire Drills* by
EAppreciating/Respecting Fire	*Tale* by J. London	Lucia Raatma
P Rock Words	*Everybody Needs a Rock* by	*Let's Go Rock*
H Reading Nonfiction	Byrd Baylor	*Collecting* by R. Gans
A Summarizing/Reporting		
S Reading Fiction	*The Worry Stone* by	*If You Find a Rock* by
E Retelling/Responding	Marianne Denger	Peggy Christian
Science of Rocks		
T Collecting/Counting Rocks	*I Am A Rock* by Jean	*Arrowheads & Stone*
W Make Rock Garden	Marzollo	*Artifacts* by C.Yeager
O Appreciating/Respecting Rocks		

Literature – Week 3	**Literature-Week 4**	**Reading, Language Arts, Science, Math, Art, Values**
Air Pollution by Darlene R. Stille *Experiment with Air* by Bryan Murphy *Air and Flight* by Sally Hewitt *Air and Flight* by Jon Richards	*Four Ancestors* by Joseph Bruchac *The Taos Indians and Their Sacred Blue Lake*/Marcia Keegan *Cheyenne Fire Fighters* by Tall Bull and Weist *Legend of the White Buffalo Woman*/Goble	Four Ancestors (Elements) Words Reading Nonfiction Summarizing/Reporting Reading Poetry/Songs/Legends The Four Elements Cost of Trash Pickup Services Recycling/Cleaning Writing Earth Poems Making Earth Day Posters Respecting the Earth
Raven Returns the Water by Anne Cameron *Coyote and the Grasshopper* by Gloria Dominic Coyote Takes Water from the Frog People by Barry Lopez in *American Indian Myths & Legends* by Erdoes and Ortiz *A Promise is a Promise* by Munsch and Kusugak	*We Need Water* by Helen Frost *Keeping Water Clean* by Helen Frost *Water Pollution* by Darlene Stille *Experiment with Water* by Bryan Murphy	Water Words Reading Legends/Fables Retelling/Responding Reading Nonfiction Summarizing/Reporting Water Science Recycling/Cleaning Cost of Bottled Water Making Earth Day Posters Respecting the Earth
Moth, the Fire Dancer in *Keepers of the Night* by Caduto and Bruchac *How Fire Got Into the Rocks and Trees* by Steven Roy *Coyote and the Firestick* by Barbara Goldin	*Firefighters to the Rescue* by E. Rodger *Forest Fire!* by Mary Ann Fraser *Fire Engines*/Marcia Freeman *Fire Night!* By Monica Driscoll Beatty	Fire Words Reading Legends Retelling/The Oral Tradition Reading Nonfiction Responding Recycling/Cleaning Clutter Preventing Fires Weighing Trash Writing Fire Safety Rules Making Earth Day Posters Respecting the Earth
Iktomi and the Boulder by Paul Goble Old Man Coyote and the Rock in *Keepers of the Earth* by Caduto and Bruchac *Coyote Steals the Blanket* by J. Stevens	*Rocks and Minerals at Your Fingertips*/Judy Nayer *Best Book of Fossils, Rocks and Minerals*/ Chris Pellant *Rocks* by Terry Jennings	Rock Words Reading Legends Retelling Reading Nonfiction Recycling/Cleaning Classifying/Value of Some Rocks Don't Be Foolish Making Earth Day Posters Respecting the Earth

ABOUT THE LITERATURE FOR PHASE FIVE –

Indian people have always recognized the four elements: earth, air, water and fire. They treat them with respect and sometimes refer to them as the Four Ancestors. Indian people have been asked to assist in solving the hole in the ozone layer problem.

About Air –

**If We Could See the Air* by David Suzuki, Nature All Around, 1996.
**Air is All Around You* by Franklyn Mansfield Branley, Let's Read and Find Out Series, 1986.
**Air* by Andy Charman, First Starts, 1994.
**Air* by Cathy Poth, Look and Learn Series, 1989.

Stories and Poems including Wind –

*Gluscabi and the Wind Eagle, **Abenaki**, and Spring Defeats Winter, **Seneca,** in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, 1988.
**The Wish Wind* by Peter Eyvindson, Pemmican, 1987.
*Strange Wind in *A Light in the Attic* by Shel Silverstein, Harper and Row, 1981.

More About Air –

**Air Pollution* by Darlene R. Stille, New True Books, 1990.
**Experiment with Air* by Bryan Murphy, Experiment With Series, 1992.
**Air and Flight* by Sally Hewitt, It's Science, 2000.
**Air and Flight* by Jon Richards, Science Factory, 1999.

Indian Stories About Earth, Air, Water and Fire –

Four Ancestors, Stories, Songs and Poems from Native North America* by Joseph Bruchac (Indian Author**).
The* ***Taos* *Indians and Their Sacred Blue Lake* by Marcia Keegan, 1975.
****Cheyenne*** *Fire Fighters* by Henry Tall Bull and Tom Weist, Montana Council for Indian Education, 1971.
**Legend of the White Buffalo Woman* by Paul Goble, National Geographic Society, 1998.
Lakota The sacred pipe is made of a special stone.

Gifted and talented students should read the more difficult selections and report to the class or help the teacher read them to the other students.

ABOUT THE LITERATURE FOR PHASE FOUR –
Indian people have always recognized the four elements: earth, air, water and fire. They treat them with respect and sometimes refer to them as the Four Ancestors. Indian tribes are very concerned about water pollution.

Indian Stories about Water –

Snail Girl Brings Water: A* ***Navajo* *Story* by Geri Keams (**Indian Author**), Rising Moon, 1998.
*How Thunder and Earthquake Made Ocean, **Yurok**, The Hero Twins and the Swallower of Clouds, **Zuni,** and Koluscap and the Water Monster, **Micmac**, in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, 1988.

About Water –

**Water* by Frank Asche, 2000.
**Water-What It Is and What It Does* by Judith Seixas, 1990.
**I Am Water* by Jean Marzollo, Cartwheel Books, 1996.
**The Water Cycle* by Helen Frost, Pebble Books, 1999.

More Indian Stories Including Water –

Raven Returns the Water* by Anne Cameron, Harbour Pub. **Northwest
Coyote and the Grasshopper* by Gloria Dominic, Troll, 1996. **Pomo
*Coyote Takes Water from the Frog People in ***American Indian*** *Myths and Legends* by Richard Erdoes and Alfonso Ortiz, Pantheon, 1984. See Activities Section of this unit.
A Promise is a Promise* by R. Munsch and M. Kusugak, Annick Pr., 1988. **Alaskan

More about Water –

**We Need Water* by Helen Frost, Pebble Books, 1999.
**Keeping Water Clean* by Helen Frost, Pebble Books, 1999.
**Water Pollution* by Darlene Stille, A New True Book, 1991.
**Experiment with Water* by Bryan Murphy, Lerner, 1992.
Be sure to stress water safety.

Gifted and talented students should read the more difficult selections and report to the class or help the teacher read them to the other students.

ABOUT THE LITERATURE FOR PHASE THREE –

Indian people have always recognized the four elements: earth, air, water and fire. They treat them with respect and sometimes refer to them as the Four Ancestors. During the summer of 2000, 5,000 Indian fire fighters helped to fight fires all over the United States.

Indian Stories about Fire -

*Loo-Wit, the Fire Keeper in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, 1988. **Nisqually**
Nanabosho Steals Fire* by Joe McClellan (Indian Author**), Pemmican. **Ojibway**
Rainbow Crow: A* ***Lenape* *Tale* by Nancy Van Laan, Knopf, 1991.
Fire Race: A* ***Karuk* *Coyote Tale About How Fire Came to the People* by Jonathan London, Chronicle, 1993.

About Fire and Fire Safety –

**Arthur's Fire Drill* by Marc T. Brown, Random, 2000.
**Stop, Drop and Roll* by Lyn L. Hester, Hester & Hester Pub., 1982.
**I Am Fire* by Jean Marzollo, Hello Science Reader, 1996.
**Home Fire Drills* by Lucia Raatma, Capstone Press, 1999.

The emphasis of this unit is on the good and bad of fire and on fire safety. It does not include experimenting with fire.

More Indian Stories about Fire –

*Moth, the Fire Dancer in *Keepers of the Night* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, 1994.
How Fire Got into the Rocks and Trees* by Steven Roy, Tipi Press, 1996. **Lakota
Coyote and the Firestick: A* ***Northwest* *Coast Legend* by Barbara Goldin, Harcourt Brace, 1996.

More about Fire and Rescue –

**Firefighers to the Rescue* by Elizabeth Rodger, Troll, 1997.
**Forest Fire!* by Mary Ann Fraser, Troll, 1999.
**Fire Engines* by Marcia Freeman, Pebble Books, 1999.
**Fire Night!* by Monica Driscoll Beatty, Health Pub., 1999.

Gifted and talented students should read the more difficult selections and report to the class or help the teacher read them to the other students.

ABOUT THE LITERATURE FOR PHASE TWO –

Indian people have always recognized the four elements: earth, air, water and fire. They treat them with respect and sometimes refer to them as the Four Ancestors. Indian people recognize the rock as representing nature and being formed by a power holding molecules together.

About Rocks (Representing Earth) and Needing Them –

**Everybody Needs a Rock* by Byrd Baylor, Aladdin.

The Worry Stone* by Marianne Dengler, Rising Moon, 1996. **Indian

**I Am a Rock* by Jean Marzollo, Cartwheel, 1998.

Rock Hunting –

**Let's Go Rock Collecting* by Roma Gans, Harpercollins, 1997.

**If You Find a Rock* by Peggy Christian, Harcourt Brace, 2000.

**Arrowheads and Stone Artifacts* by C. G. Yeager.

Indian Stories about Rocks –

Iktomi and the Boulder* by Paul Goble. **Lakota

*Old Man Coyote and the Rock in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, 1988. **Pawnee**

**Coyote Steals the Blanket* by J. Stevens, Holiday House, 1996.

More about Rocks –

**Rocks and Minerals at Your Fingertips* by Judy Nayer, McLanahan Book Co., 1995.

**The Best Book of Fossils, Rocks and Minerals* by Chris Pellant, Larousse Kingfisher Chambers, 2000.

**Rocks* or *Find Out About Rocks* by Terry Jennings, Bbc. Pubns., 1999.

FURTHER RESOURCES FOR EARTH, AIR, WATER AND FIRE UNIT- These materials can be used to substitute for books in the suggested unit outline or for additional reading/other activities for students.

Mother Earth's Counting Book by A. Clements, Picture Book Studio, 1992.

Good Earth Art: Environmental Art for Kids by Mary Ann Kohl, 1991.

Flying and Floating by David Glover, Kingfisher Books, 1993.

*Air (The Four Elements) by Maria Rius, 1985.

Air: Simple Experiments for Young Scientists by Larry White, 1996.

Feel the Wind by Arthur Dorros, 1990.

Up in the Air by Wendy Madgwick, Raintree/Steck Vaughn, 1998.

My First Plane Ride by Elizabeth Benjamin, Golden Books, 1999. Also by Erin Gathrid

Around the Pond by Ann Cooper, Court Wayne Press, 1998.

Along the Seashore by Ann Cooper, Court Wayne Press, 1997.

All Along the River by Allan Fowler, Children's Press, 1994.

Oceans and Rivers by Michael W. Carroll, Chariot Victor Pub., 1999.

Science with Water by Helen Edom, EDC Pub., 1992.

Blue Dawn in Keepers of Life by M. Caduto and J.Bruchac (Indian Author), Fulcrum, 1998. **Pueblo**

How Raven Made the Tides, **Tsimshian,** and Sedna, the Woman Under the Sea, **Inuit**, in Keepers of the Earth by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, 1988.

Muskrat Will Be Swimming by Cheryl Savageau (**Indian Author**), Northland Press.

*Water (The Four Elements) by Carme Sole Vendrell, 1985.

Safety Around Fire by Lucia Raatma, Capstone Pr., 1999.

Little Badger and the Fire Spirit by Maria Campbell (**Indian Author**), McClelland, 1977.

Firefighters A to Z by Chris L. Demarest, Margaret Elderberry, 2000.

Coyote Goes Hunting for Fire by M. Bernstein and J. Kobrin, Scribner, 1974. **California**

The Fire Bringer: A **Paiute** Indian Legend by Margaret Hodges, Little, 1972.

It's Fire Drill Day by Steve Metzger, Cartwheel Books, 1998.

*Fire (The Four Elements) by Maria Rius, 1985.

*The Fire Station by Michael Martchenko, 1991. Also by Robert Munsch

*Fire Engines by Anne Rockwell, Picture Puffins, 1993.

Coyote and Rock and other Lushootseed Stories by Vi Hilbert (**Indian Author**). **Skagit Audio Tape**

If You Are a Hunter of Fossils by Byrd Baylor.

Ultimate Sticker Books: Rocks and Minerals by Helena Spiteri, DK Pub., 1998.

The Smiling Stone by Marcia Trimble, Images Press, 1998.

The Rock by Daniel Birchmore, 1997.

Eyewitness: Rocks and Minerals by Steve Parker, DK Pub., 1997.

It Could Still Be a Rock by Allan Fowler, Children's Press, 1993.

Tunka-Shila, Grandfather Rock in *Keepers of the Earth* by Michael Caduto and Joseph Bruchac (**Indian Author**), Fulcrum, 1988. **Lakota**

What's the Earth Made of? by Susan Mayes, 1995.

Earth: the Elements by Ken Robbins, 1995.

Brother Eagle, Sister Sky: A Message from Chief Seattle by Susan Jeffers, Dial, 1991. **Northwest**

And Still the Turtle Watched by Sheila MacGill-Callahan. **Indian**

CHECK YOUR LIBRARY OR BOOKSTORES FOR OTHER BOOKS RELATING TO THE TOPIC.
***These books are especially suitable for Phase One – for preschool children.**

EARTH, AIR, WATER AND FIRE WORDS

Beginning Sounds-

brown
big
boulder
bag
burn
blaze
blow
breeze
breathe
blue
bath
bathe
bottle

pour
puddle
pollution
pebble
pretty

rock
round
roll
rain
raindrop
river
run
recycle
red

creek
cycle
clean
can
cloud
cook
cold
cool
compare
collect

small
soil
stone
sand
search
space
solid
safety
smooth
stop
start
smoke
swim
saltwater
steam
stream
south
snow
scientist

danger
drop
drill
disaster
detector
drink
damp
dirty
dirt

warm
wind
west
water
wet
wash

flame
fire
fumes
freshwater
faucet
flood
float
flight
fossil
flint

ground
gravel
garbage
gas

hard
hunt
hot
heat
hose
hail

lake
liquid
light
lava

measure
melt
mass
mud
mineral

OU Sounds-
south
ground
cloud
round

Exceptions-
boulder
pour

Long Vowel Sounds-
ice
smoke
stone
fire
flame
blaze
bathe
hose

hail
breathe
clean
float
heat
rain
steam
stream
east
creek
breeze

Exceptions-
ocean
break
search
breath

Compound Words-
firefighter
fireman
saltwater
freshwater
raindrop
arrowhead

Ending sounds n, k and l-
brown, burn, clean, can, rain, run, stone, pollution
break, creek, cook, drink, rock, smoke, truck, lake
hail, cool, drill, fossil, soil, small, roll

Other Words-

trash
earth
oxygen
jagged
evaporate
orange

element
air
vapor
north
ashes
alarm

Word walls should be maintained. Instructors should ensure that students know the meanings of these words in this context and extend vocabulary by noting how they may mean other things in other contexts or they may have homophones. Experiences, pictures and student illustrations should be used to explain and process word meanings. Words that rhyme with these words can be examined to extend vocabulary and to see varying spellings for sounds. Other words should be added.

SCIENCE STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN EARTH, AIR, WATER AND FIRE UNIT-

Standard – Understands the convictions scientists share about the nature of the world and what can be learned about it
Benchmarks-
Understands that science experiments normally have reproducible results: science experiments generally work the same way in different places

Standard – Understands that scientific inquiry works in particular ways
Benchmarks-
Understands that learning can come from careful observations and simple experiments
Understands that tools like thermometers, magnifiers, rulers, or balances add to information from our senses
Understands the importance of careful description in science and how it allows comparison
Understands that individuals can interpret the same thing in different ways

Standard – Knows basic concepts about the earth
Benchmarks-
Knows that water can be a liquid, like rain, or solid ice, and can be made to go back and forth from one form to the other, but the amount of water stays the same.
Knows that water in a closed container stays the same, but water left in an open container disappears (evaporates)
Knows that when liquid water disappears, it turns into gas (vapor) in the air and can re-appear as a liquid when cooled
Knows that air is a substance that surrounds us, takes up space, and whose movement we feel as wind
Knows that clouds, like fog and steam from a kettle, are made up of tiny droplets of water
Knows common rocks and minerals, what they are made of, and how they form
Knows the major differences between fresh and ocean waters

Standard – Understands the processes that shape the surface of the earth and the relation of the surface of the earth to the living environment
Benchmarks-
Knows that rocks come in all sizes, from boulders to grains of sand
Knows that change is something that happens to many things around us

Standard – Knows the forms energy takes, its transformations from one form to another, and its relationship to matter
Benchmarks-
Knows that things that give off light often give off heat

Standard – Understands basic concepts about the structure of matter
Benchmarks-
Knows that all objects occupy space and have mass
Knows that objects can be described and classified by their composition and their physical properties
Knows that materials can exist in different states (solic, liquid, gaseous, each having characteristic properties
Knows that some properties of a materials may be changed by external actions like heating and cooling, but different materials respond differently to the same actions

Standard – Knows about the diversity and unity that characterize life
Benchmarks-
Knows that stories sometimes give plants and animals attributes they really do not have

Standard – Understands the cycling of matter and flow of energy through the living environment
Benchmarks-
Knows that many materials can be recycled; recycled materials continue to exist, but in another form

Standard – Understands the basic concepts of the evolution of species
Benchmarks-
Knows that some kinds of things that live today still resemble once living things that have completely disappeared
Knows that fossils provide evidence that some organisms living long ago are now extinct and can be compared to one another and to living organisms according to their similarities and differences

Standard – Understands the nature of the Chemical Revolution
Benchmarks-
Knows that things have properties that can be used to tell them apart and find out which of them are alike (conductivity, density, solubility)
Knows that objects that are alike in some ways may be different in others
Knows that is it possible to learn about all kinds of objects by counting or measuring them in different ways and comparing the results
Knows that fire – along with air, earth and water – was long believed to be the substance out of which everything else was made; this seems sensible, though no longer believed, because it looks like fire is given off when something burns

Standard – Understands the nature of physical, conceptual, and mathematical models and the uses of them
Knows that one way to describe something is to say what other things it is like
Knows that geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, and even stories can be used to represent objects, events, and processes in the real world, although these representations can never be exact in every detail

MATH STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN EARTH, AIR, WATER AND FIRE UNIT-

Standard- Effectively uses a variety of strategies within the problem solving process
Benchmarks-
Brainstorms possible things to do
Draws pictures to represent problems
Clarifies problems using discussions with teacher or knowledgeable others
Uses guess and check to solve problems
Clearly states problems in his or her own words
Checks the reasonableness of results through estimation

Standard- Understands and applies basic and advanced properties of numbers
Benchmarks-
Has a general understanding of the concept of number
Uses counting to exemplify numbers
Orders small sets of numbers
Understands the relationship of fractions to decimals and whole numbers

Standard- Uses basic and advanced procedures while performing the process of computation
Benchmarks-
Adds, subtracts, multiplies, divides whole numbers with accuracy
Adds, subtracts, multiplies, divides decimals with accuracy

Standard- Understands and applies basic and advanced methods of measurement
Benchmarks-
Understands the relationships between length, width and height
Understands the basic characteristics of weight and how it is measured
Has a basic understanding of the concept of temperature and how it is measured
Understands the basic features of mass
Makes effective use of ruler, thermometer and scale for making measurements

Standard- Understands and applies basic and advanced concepts of data analysis and distributions
Benchmarks-
Has a basic understanding of the concept of data
Collects and organizes simple data sets to answer questions

Standard- Understands and applies basic and advanced properties of functions and algebra
Benchmarks-
Identifies basic number patterns
Has a basic understanding of the concept of variable

LANGUAGE ARTS STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN EARTH, AIR, WATER AND FIRE UNIT -

Standard – Gathers information effectively through reading, listening and viewing
Benchmarks –
Provides an accurate retelling of the basic plot of simple stories the student has read, heard or viewed
Provides an accurate retelling of the main idea of simple expository information the student has read, heard or viewed
Understands that reading, viewing and listening are ways of gaining information about the world
Determines meaning of simple words from context
Creates mental representations for concrete information read, heard or viewed

Standard – Reads and responds to literature
Benchmarks –
Understands that stories have beginning, middle and ending episodes
Understands the genre of legends and fables

Standard – Communicates ideas and information in writing
Benchmarks –
Understands basic connections between spelling patterns and speech sounds
Understands basic phonological patterns in English
Expresses ideas in simple expository forms
Composes simple stories that express cohesive ideas
Experiments with different genre as modes for expressing ideas

Standard – Understands and applies basic principles of language use
Benchmarks –
Recognizes characteristic sounds and rhythms of language
Makes valid observations about the use of words
Makes valid observations about the use of language at home as opposed to the use of language in school

Standards and Benchmarks from *The Systematic Identification and Articulation of Content Standards and Benchmarks,* Mid-continent Regional Educational Laboratory, 1994.

AMERICAN INDIAN CONTENT STANDARDS FOR PRIMARY GRADES ADDRESSED IN EARTH, AIR, WATER AND FIRE UNIT –

SCIENCE

Science As Inquiry-
Indian students should develop an awareness that observations and understandings of ecological relationships traditionally formed an essential base of knowledge among American Indian cultures.

Physical Science-
Indian students should develop an understanding of the innate properties of objects and materials that were (and are) recognized by traditional American Indian cultures in the manufacture and use of specific material objects that capitalize upon those properties.

Earth Science-
Indian students should develop an understanding of properties of earth, air, water and fire and how they served as a basis for traditional American Indian production of clothing, housing, tools, and other objects.

Science and Technology-
Indian students should develop an awareness of the problem solving skills demonstrated by historical American Indians in the development of tools and technologies.

LANGUAGE AND LITERACY

Indian students should be able to –

Listen for meaning and gain information from spoken English and a Native language.

Listen to Indian stories told in the oral tradition, comprehend their teachings and be able to retell them.

Speak coherently, conveying ideas in both English and a Native language.

Read fluently and independently, a variety of materials including those with American Indian themes.

Locate and use a variety of texts to gain information, for example, historical materials about their tribe, tribal legends and stories and oral history transcription.

Be familiar with children's literature with Indian themes, especially with that pertaining to the student's tribe and literature written by Indian authors.

MATHEMATICS

Mathematics as Problem Solving-
Indian students should formulate problems from everyday and mathematical situations within their home and tribal/community worlds.

Mathematics as Communication-
Indian students should realize that representing, discussing, reading, writing, and listening to mathematics are vital parts of learning and using mathematics because it creates holistic instruction akin to a traditional Indian approach to learning.

Mathematics as Reasoning-
Indian students should use models, known facts, properties and relationships to explain their thinking, using objects or ideas from their own or other American Indian cultures.

Estimation-
Indian students should explore estimation strategies through activities derived from their cultural worlds.

Number Sense and Numeration-
Indian students should construct number meanings through real-world experiences and use of physical materials.

Concepts of Whole Number Operations-
Indian students should develop meaning for the operations by modeling and discussing a rich variety of problem situations including some from the Indian world.

Whole Number Computation-
Indian students should use a variety of mental computation and estimation techniques in solving problems related to Indian cultural themes.

Measurement-
Indian students should understand the attributes of length, capacity, mass, and volume and relate these measures to use in their own cultural, home, tribal or community worlds.

Statistics and Probability-
Indian students should collect, organize and describe data related to local tribal/community demographics.

Fractions and Decimals-
Indian students should apply fractions and decimals by applying them to real world situations using Native cultural experiences.

American Indian Content Standards, ORBIS Associates for Office of Indian Education Programs, Bureau of Indian Affairs, United States Department of the Interior, 1996.

Example Activities Developed by Teachers of American Indian Students

Workshop on Culturally-Based Math and Science Curriculum Development
Haskell Indian Junior College
1992 & 1993

Ideas should be adapted for appropriateness.

SCIENCE -

"FINDING YOUR SPECIAL ROCK"

CULTURAL OUTCOME: II
SCIENCE OUTCOME: IV

CULTURAL OBJECTIVE:

Students will understand their relationship to Mother Earth based upon their knowledge of the earth's surface.

SCIENCE OBJECTIVE:

Students will discover the composition of the earth's surface.

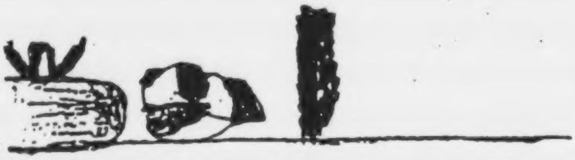
TEACHER'S BACKGROUND INFORMATION:

"Everybody Needs A Rock," by Byrd Baylor, tells the story of a child who is searching for his special rock. This book provides beautiful illustrations of rock formations that children can identify. The child finds the rock that is special to him for the beauty that only he can see.

Additional Reading: "The Desert Is Theirs" by Byrd Baylor.

Seve

My rock is special becacuse it
looks like meat and space.
Now I'm going to draw a pictur of my
rock. I like my rock.



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STUDENT LEARNING ACTIVITIES:

1. Read the story, " Everybody Needs a Rock."
2. Take a walk around the school yard to collect rocks.
3. Have the students sort and chart the rocks by size, color, and shape.
4. Ask the students to identify their favorite rocks.
5. Give the students colored pencils or water colors so that they can illustrate their rocks.

OPTIONAL ACTIVITIES:

1. Discuss and show pictures of geological formations from mountains, hills, valleys, lakes, rivers, and oceans.
2. Identify special rock formations in the local area.
3. Provide examples of different types of rocks such as varieties quartz, agates, and geodes.

EVALUATION ACTIVITY:

Create a classroom book by having the students illustrate and write about their special rocks.

RESOURCES:

Baylor, Byrd. Everybody Needs A Rock. New York: Macmillan, 1974.

Baylor, Byrd. The Desert is Theirs. New York: Macmillan, 1975.

DEVELOPED BY:

Bonnie McGinnis

SCIENCE --

"ROCKS"

CULTURAL OUTCOME: II
SCIENCE OUTCOME: IV

CULTURAL OBJECTIVE:

Students will appreciate the Native American beliefs in and respect for the kinship of all living things.

SCIENCE OBJECTIVE:

Students will identify kinds of rocks, water, and land around us.

TEACHER'S BACKGROUND INFORMATION:

Rocks (which have life cycles of millions of years) have wonderful stories to tell. A wide variety of myths and legends tell of the Indian's relationship to rocks. Many Native American people believe that every part of the earth is sacred – even the stones and rocks of the earth. They believe that there is a special kinship between people and every part of nature, including rocks.

In "Our Forgotten Relatives," Robert LaBatte, Cheyenne River Sioux, tells of a rock that was sacred to his people in South Dakota. Named Medicine Rock, It was about 10 ten feet wide and 20 feet long, and was said to have been put there by the Great Spirit, who also left his handprint on the center of the rock.

This rock was a place where Indians came to pray. Mothers put the clothing of their children on the rock, along with prayers for their healing. Warriors stopped there to pray for victory before battles. Yet, in 1950, government officials declared that the rock stood "in the way of progress" because they wanted to build a dam on the site. Construction of the dam would cause the rock to be inundated by water. Therefore, a small non-Indian town got permission from a non-Indian on whose land the stone rested, to move it to their town as a tourist attraction. It was much abused there, and the meaning of the rock was lost to the Sioux people for a generation.

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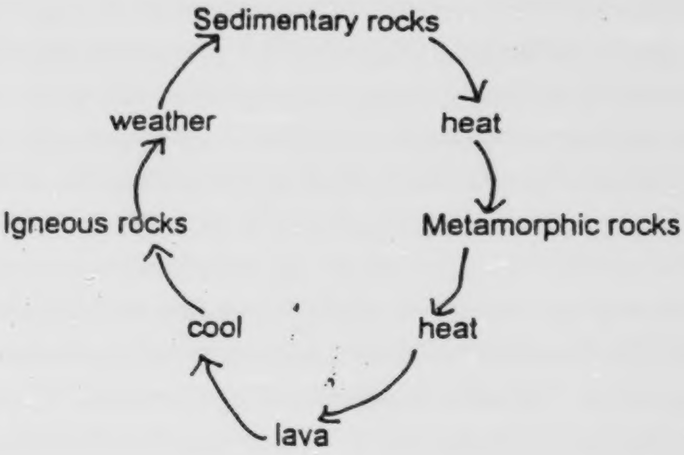
LaBatte has asked to bring the rock back to the reservation where it belongs. He says that there are many sacred rocks in this country which are like our relatives. They are nations which are here to help us.

See also "Tunka-shila, Grandfather Rock," and "Old Man Coyote and the Rock", pp. 57-58 in Keepers of the Earth.

A rock is a piece of the earth's crust. Rocks come in all sizes, shapes, and colors. Geologists classify rock into three basic groups: igneous, sedimentary, and metamorphic. The rock cycle is the name given to the process that recycles rock material of the earth.

The Rock Cycle


Sedimentary rocks
weather
heat
Igneous rocks
Metamorphic rocks
cool
heat
lava

STUDENT LEARNING ACTIVITIES:

1. Take the class on a walk around the school to collect different types of rocks. Ask students to save their special rocks to use for the activities listed below.

2. Make dioramas with the rocks which the students have collected, using shoe boxes, and pictures of various environments such as the seashore, woodlands, or a stream bed.

    a. Prepare the shoe boxes by turning them on their sides and using materials, pictures, or both to stimulate the settings for the rocks.

    b. Explain that one way geologists identify rocks is by the location in which they are found.

    c. Talk about the rocks the students have collected. Where were they found? What do the rocks look like? Place the rocks in the appropriate scenes.

    d. Place the rocks and boxes in the science area so that the students can continue to use them.

3. Take the class on a field trip to a geology display, rock shop, or stream bed.

4. Play "Rock to Rock" with the class:

    a. Look at samples of three types of rock: sedimentary, metamorphic and igneous.

    b. Show and discuss the diagram of the rock cycle.

    c. Read the rock story while students sit with their eyes closed, then ask students to draw pictures of their fantasy journey.

"A ROCK"

Imagine that you are a rock. You live on a sunny hillside. It is very hot. Can you feel the sunlight warming you?

During the winter, you are worried about the ice that freezes in the crack on top of you. This crack grows bigger each year because the ice pushes hard on the sides of the crack.

One spring, it is very wet as rain pours into streams rushing down the hillside. Feel the wetness of the water flowing over you as it streams into the dirt below you.

Suddenly, the Earth begins to shake. You begin to roll down the valley. Ow! You hit another rock which splits into two halves.
Splash! You land in the river. You are pushed by the water and you are getting all broken up into gravel and sand. Finally you settle down on an area along with millions of pieces of sand and gravel.

Some pieces settle on top of you. You yell, "Stop pushing!" but more weight presses down. Your pieces get pushed and stuck together with other pieces. You are now hardening and becoming a sedimentary rock. The pressure grows and you begin to get warmer. You change color and hard. Now you're a metamorphic rock. You keep getting pushed further down. It is hot. It is boiling hot! Everything begins to melt and you are part of a hot mess of melted rock.

Wait, you're being pushed up and the Earth is shaking and rumbling again. You burst up out of the top of a volcano. Red-hot lava is all around you. You land on a high point of the volcano away from the hot flow. Slowly, the volcano begins to quiet down and the lava cools and hardens. You are now a cold, grey igneous rock on top of a volcano – your new home.

Adapted from Caduto, Michael and Burchac, Joseph. Keepers of the Earth. Golden, Colorado: Fulcrum, 1989.

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EVALUATION:

1. Have students tell about the cycle of the rocks, then name other cycles, such as the cycle of seasons.
2. Ask the class to find pairs of rocks in a sandbox, then make a collection display.
   - a. Go to the sand box and hide the rock pairs before the students arrive.
   - b. Prepare the students by saying that the rocks that they have studied during the past week were buried by a tremendous land slide in the sand box, leaving two of each kind of rock.
   - c. Have them look for matching pairs of rocks.
   - d. Students can display their rocks on a special table.

RESOURCES:

Caduto, Michael J. and Burchac, Joseph. Keepers of the Earth: Native American Stories and Environmental Activities for Children. Golden, Colorado: Fulcrum, 1989.

Williams R. Mudpies to Magnets. Mt. Rainer, Maryland: Gryphon House, 1987.

DEVELOPED BY:

Vera Freeman
Becky YoungBear

SCIENCE --

"LIVING WATER"

CULTURAL OUTCOMES: II, XI X
SCIENCE OUTCOMES: I, III, IV

CULTURAL OBJECTIVE:

Students will understand Native American respect and reverence for water.

SCIENCE OBJECTIVES:

Students will:

- describe their impact on the environment
- sort living things into related groups
- compare characteristics of different plant and animal environments
- explain the importance of earth's air and water.

TEACHER'S BACKGROUND INFORMATION:

To the Native American, water is a strong living spirit. In some of the Southwest tribes, dances and ceremonies are performed to ask for rain. Stories are also passed down in many tribes from one generation to another to instill in the children the sacredness of water.

This unit includes a Crow story written by Henry Real Bird. The story has been paraphrased, but it will still give the students the idea that water is alive, important for the existence of all living things, and often changes in form.

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STUDENT LEARNING ACTIVITIES:

1. Read to the students the story "Water Story" found at the end of the lesson. After the story, discuss the importance of water in our lives. Have students explain what they think the author meant when he said "Water is the greatest thing in the world. Wherever water goes, there is life." An ongoing class poster could be developed to list and illustrate the many uses of water and how it affects our lives.

2. Have a class discussion on where water is found. List the responses on the board or butcher paper. After list is completed, do the following activity to demonstrate that water is all around us including the air.

   Instruct students to breathe on the windows or mirrors to demonstrate condensation of water vapor.

   Ask students to explain what occured. Explain to the students that the fog or tiny water drops they saw on the mirror was water from the air. The water in the air is a gas called water vapor and it condenses to a liquid as the vapor cools on the surface of the mirror.

   Have students write in a science journal what they observed and a definition of water vapor.

3. In this next activity, students will observe how water vapor turns into rain. Explain to students that as the sun hits the water on the earth, the water is heated and some of the water will evaporate into the air forming water vapor. As the warm air and water rises to meet the cooler air, something will occur. Have students predict what they think will happen. Write predictions in their journals and then watch the activity to check their predictions.

   a. Pour a cup of hot water in a quart size jar.

   b. Place a pie tin with ice in it on top of the jar.

   c. Water condensation should occur. Have students explain what they observed. Discuss with students the activity, and how it demonstrates why it rains

   d. Students can write down their observations and what they learned in their journals.

4. Show the students a picture of the water cycle and discuss. Have the students explain how the previous activity ties in with the water cycle.

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5. Introduce students to the two types of water on Earth, saltwater and freshwater. Categorize the different bodies of water as either salt or freshwater. See how many different bodies of water the students can come up with. Discuss the types of bodies found in their geographic area. For students who have never been to the ocean, have pictures of the ocean to show them. Have the class make a freshwater and a saltwater collage using magazine pictures.

6. Make and taste saltwater, observe how the salt is left behind when saltwater evaporates, and compare saltwater's freezing properties to freshwater.

   Each student will need a 4 ounce cup of warm water. In each cup, place a teaspoon of salt. Students should stir until dissolved. Let students take a taste of the saltwater. Have them record in their journals what they did and how the water tasted. Explain to the students how this water is like the ocean's water.

   Next, fill an ice cube tray with saltwater and another tray with freshwater. The water in each tray should be the same temperature. Put in the freezer and watch to see which freezes first. Explain to students the saltwater freezes at a lower temperature. Discuss which bodies of water would freeze in the winter.

   With the remaining saltwater, pour into a glass plate and place in a window. Over a period of days, students should record what is happening to the water. Eventually, the water should evaportate leaving only the salt behind.

7. Have the students draw and color a picture of what they think life would be like if they lived underwater in a pond or lake. When pictures are completed, let each student share his/her picture with the class.

   Ask students what they think water pollution is. Lead a discussion on the types of water pollution, the effects of water pollution on plants, animals, and humans. Ask students how their pictures might be different if the water was polluted in their picture. Discuss ways they can help keep the water clean and the importance of clean water to them.

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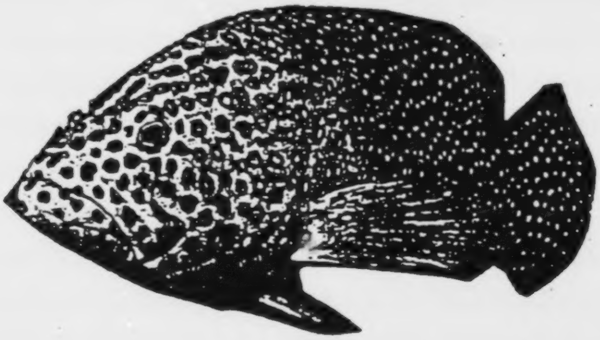
8. Visit a body of freshwater. Before leaving on the field trip, discuss the different types of life and environment in and around freshwater and saltwater. This information could be added to the previous webbing. When your arrive, take a few minutes to sit and have students quietly observe the environment around them. Have them listen for different sounds of life and remind them how all living things are dependent upon water. Students could write in their journals what they observed.

Instruct the students to walk around the body of water or shoreline and search for different types of life (insects, plants, animals, ect..). Remind them to look under rocks. If strainers are available, let them sieve the mud. Hand lenses could also aid in the students findings. Remind students to treat all living thing with respect and place them back into their habitat.

Students should answer worksheet questions. Let students draw pictures of what they saw.



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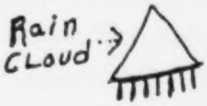
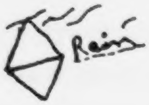
EVALUATION:

1. Teacher observations
2. Discussions



3. Journals



4. Worksheet from field trip
5. Make a mural of the local water cycle.
6. Definitions: water vapor, saltwater, freshwater, evaporates, water pollution, and environment.

RESOURCES:

Caduto, Michael J. and Joseph Burchac, Keepers of the Earth: Native American Stories and Environmental Activities for Children. Golden, Colorado: Fulcrum, 1989, pp. 87-90, 100.

American Indian Institute, Native American Cultural Lessons. University of Oklahoma, Norman, Oklahoma: 1987.

Science Horizons, Teacher Edition 2. New York: Silver, Burdett & Ginn, 1987.

DEVELOPED BY:

Cynthia Henley

"WATER STORY"

By Henry Real Bird
(paraphrased)

The Crow people respect the mystery of water. They say that when you feed the water, the water people will watch over you while you swim. So, children would take fat, bones, and meat to feed the water people, and would then have much fun swimming. The water was fresh, clean, and tasted good.

The grandfather would tell the children, that water had great mystery. It comes out of the ground, turns into a cloud and then flows down and becomes a stream, creek, brook, or river. Sometimes it is unable to flow, so it becomes a puddle, pond, lake, or ocean. Water is where fish, frogs, turtles, and beavers live.

Everything that lives has water in it. Wherever water goes, there will be life. If a flower or an antelope do not have water, they will die.

The grandfather would tell how the grandmother would heat water to cook the meat and how the water would start to dance on top, jump out of the pot and turn into steam.

"Remember," he would say, "water has great mystery. As the temperature changes, so does water. In the winter, the clouds drop soft snow. The ground turns white and many animals change their clothes."

"As the weather becomes warmer, the snow melts and flows to a lower level. The muddy water runs into the river which becomes very strong. It moves everything that is in the way including large trees."

"The water will soak into the ground and tell the flowers, grass, and leaves to come out and color the earth. The birds will also return to thier homes. And, in the summer, the rains will fall and tell the berries, watermelon, and pototoes to come out."

"Remember, water has great mystery. The more water you have the stronger you are. Water is the greatest thing in the world. Wherever water goes, there is life. So take care of it."

SCIENCE --

"LIFE-CHANGING WATER"

CULTURAL OUTCOME: II
SCIENCE OUTCOME: I

CULTURAL OBJECTIVE:

Students will understand their relationship with Mother Earth and the spiritual and natural worlds.

SCIENCE OBJECTIVE:

Students will understand the relationship between water and their environment.

TEACHER'S BACKGROUND INFORMATION:

Water is sacred to Indian people, who believe that it has a strong spirit and can be found in all areas of life. It helps tie together their relationship to Mother Earth and their spiritual nature. The Crow story written by Henry Real Bird, and the Kalapuya myth, "Coyote Takes Water From the Frog People," told by Barry Lopez, demonstrates the significance of water.

STUDENT LEARNING ACTIVITIES:

1. Have the students sit in a circle as the water story is being told. Ask questions about water and its importance to people and animals. Discuss local bodies of water and what lives there.

2. During the circle time provide the students with opportunities to see and feel water change. Pass an ice cube around the circle. Ask what is happening as it melts. Point out terms such as "melting" and "liquid."

3. Use the globe to show that the blue represents bodies of water. Name the oceans, pointing out the one closest to the child's home.

4. Introduce songs about rain or water to the students. One of them could be the "Rain Song" sung to the tune, "Are You Sleeping?"

   It is raining, It is raining,
   On my head, On my head
   Pitter, Pitter, pat, pat
   Pitter, Pitter, pat, pat
   Now I'm wet, now I'm wet.

   It is raining, It is raining
   On the plants, On the plants
   Pitter, Pitter, pat, pat
   Pitter, Pitter, pat, pat
   Now they'll grow, now they'll grow.

   It is raining, It is raining
   On the dirt, On the dirt
   Pitter, Pitter, pat, pat
   Pitter, Pitter, pat, pat
   Now there's mud, now there's mud.

5. Read the Kalapuya myth retold by Barry Lopez, "Coyote Takes Water from the Frog People."

6. Illustrate the effects of water pollution:

   a. Get the attention of the students by setting out a dishpan of water in a learning center filled with toy tires, toy cars, plastic lids from milk cartons, and glass pop bottles. Attach a paper clip to some of them. Let the students explore, pick up objects, ask questions, and inquire of other students.

   b. Discuss how we take care of Mother Earth and do not abuse her. Show the worksheet of the polluted beach. Ask what does not belong there. Color the items that are bad for the beach.

   c. Play "Clean Up Our Water". Let some students use a fishing pole (a stick with a magnet attached to a string or some fishing line) to clean up the ocean or dish pan. Name the items as they are pulled out of the water.

   d. Make a water cycle: Clouds to Rain, Rain to Lakes and Streams, Streams to Evaporation, Evaporation to Clouds. Then do various activities of group stories, books, posters, etc. to illustrate the water cycle and pollution. Emphasize the constant interaction between the sun and the earth that provides the needs for all living things.

   e. Have the students make a raindrop bulletin board, placing raindrops in strategic positions.

7. Illustrate the effects of oil spills:

   a. Materials: aluminum pie pan, sand and rocks, water, dropper, motor oil, small plants, spoon, paper towels, Q-tips.

   b. Procedure:
      Divide class into groups of 4 or 5 students
      Pass out pie tin with sand and rocks
      Press small plants into sand, then fill the pan about 1/2 full of water
      Put about 5 drops of oil into the pan. Have students use different methods to clean up the "oil spill," (spoon, wind, other water, paper towels, cotton balls, string).

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EVALUATION:

Have the students discuss what water means to them and describe their favorite water activities. After showing pictures of children bathing, washing their hands and face, drinking, swimming, etc., ask the students to draw a picture of what they like to do in the water.

RESOURCES:

Henry Real Bird, "Water Story." Native American Cultural Lessons Preschool Through High School. American Indian Institute, Norman, Oklahoma: University of Oklahoma, 1987, pp. 9-10.

Barry Lopez, "Coyote Takes Water from the Frog People" in Richard Erdoes and Alfonso Ortiz, American Indian Myths and Legends. New York: Pantheon Books, 1984, pp. 355-356.

Madison County Title V, Environmental Curriculum Guide: Culture Based Environmental Curriculum, Alabama, 1990.

Tolman, Marvin N. and James O. Morton, Earth Science Activities for Grades 2-8, Book III. West Nyack, New York: Parker Publishing, 1988.

DEVELOPED BY:

Carol L. Martin
Vera Freeman
Becky YoungBear
Mary Stonehouse
Georgie Riley
John Wray

"COYOTE TAKES WATER FROM THE FROG PEOPLE"

by Barry Lopez

Coyote was out hunting and he found a dead deer. One of the deer's rib bones looked like a big dentalia shell, and Coyote picked it up and took it with him. He went up to see the frog people. The frog people had all the water. When anyone wanted any water to drink or cook with or to wash, they had to go and get it from the frog people. Coyote came up. "Hey, frog people, I have a big dentalia shell. I want a big drink of water - I want to drink for a long time."

"Give us that shell," said the frog people, "and you can drink all you want."

Coyote gave them the shell and began drinking. The water was behind a large dam where Coyote drank.

"I'm going to keep my head down for a long time," said Coyote, "because I'm really thirsty. Don't worry about me."

"Okay, we won't worry," said the frog people.

Coyote began drinking. He drank for a long time. Finally one of the frog people said, "Hey, Coyote, you are drinking a lot of water there. What are you doing that for?"

Coyote brought his head up out of the water. "I'm thirsty."

"Oh."

After a while one of the frog people said, "Coyote, you sure are drinking a lot. Maybe you better give us another shell."

"Just let me finish this drink," said Coyote, putting his head back under water.

The frog people wondered how a person could drink so much water. They didn't like this. They thought Coyote might be doing something.

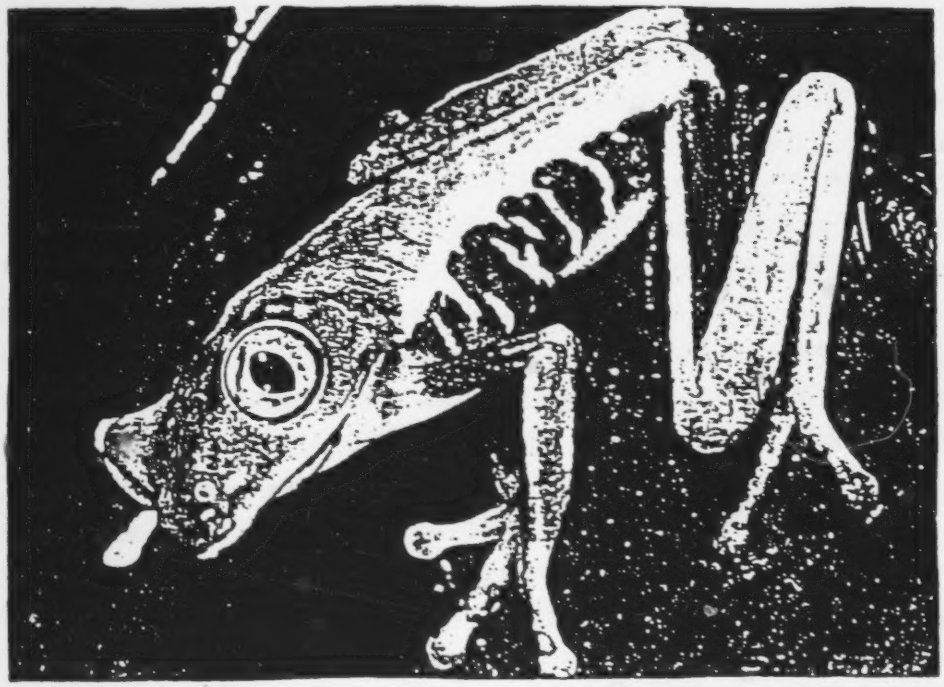
Coyote was digging out under the dam all the time he had his head under water. When he finished he stood up and said, "That was a good drink. That was just what I needed."

Then the dam collapsed, and the water went out into the valley and made the creeks and rivers and waterfalls.

The frog people were very angry. "You have taken all the water, Coyote!"

"It's not right that one people have all the water. Now it is where everyone can have it."

Coyote did that. Now anyone can go down to the river and get a drink of water or some water to cook with, or just swim around.



SCIENCE/MATH -

"Protection of Natural Resources"
(Air, Water, Soil)

CULTURAL OUTCOME: II, XIII
MATH OUTCOME: I, II, VII, VIII
SCIENCE OUTCOME: I, IV, VI

CURRICULUM AREAS: Math
Science

TIME FRAME: 10 Days

CULTURAL LEARNING OBJECTIVES

Students will:

understand and appreciate Native American customs and traditions to preserve and protect Mother Earth's natural resources.

MATH LEARNING OBJECTIVES

Students will:

use problem-solving strategies to investigate and understand their relationship to the community

use varied forms of measurement, estimation, mental computations, and select the most appropriate methods of computation to communicate relationships and to relate to their environment.

SCIENCE LEARNING OBJECTIVES

Students will:

develop a working knowledge of science and the social, technological and environmental impact of science on their lives

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STUDENT LEARNING ACTIVITIES:

AIR POLLUTION

1. Activity I: "Dirty Air That We Breathe"

   a. Materials:
   Magnifying glass
   Clean, large mouth jars
   Petroleum jelly

   b. Procedure:
   1. Coat the inside of a jar with petroleum jelly.
   2. Place the jar, uncovered, outside in an undisturbed area for a day.
   3. After bringing in the jar, look at the petroleum jelly through a magnifying glass.
   4. Ask the students about their observations (water, dirt, insects, pollen).
   5. Have the students draw a picture showing how the air may have carried the particles to the jar.

2. Activity II: "Pollutants"

   a. Ask students to list ways in which human activities pollute the air. Write suggestions on a chart. Some possibilities include: car exhaust, smoking, fireplace usage, factory pollution, power plant emissions, etc..

   b. Tell students that people used to think that human pollution would not affect air quality because of the large volume of air in the atmosphere. What do they think now? (Get sources from newspapers, magazines, environmentalists).

   c. Activity: Have the students make an eight foot mark on the wall, measuring from the floor. The 8' mark represents the limits of the atmosphere, about 300 miles above sea level. Have the students measure two inches from the floor. This distance is the part of the atmosphere where living things breathe and weather takes place.

SOLID WASTE

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1. Activity I: "Trash Can Sorting"

   a. Materials:
   Two or more full classroom trash cans, containing

food or liquid.
Plastic sheet for trash
Plastic, disposable gloves for students

b. Discuss why solid waste can become an environmental problem.

c. Place the full trash can on the table in front of the class. Explain that each day these cans will be collected from each classroom at the school. Ask the class to make a prediction of how many cans per week will be collected. Discuss the process used to arrive at a good estimation.

d. After the sorting process, ask the students how much of the contents can be recycled or reused. Use total numbers of cans for measurement.

e. Students will help develop a survey or questionnaire for collection of cans. List through class discussion what they should know, who to ask, and/or what they should observe.

f. Example questions:

    1. How many trash cans are filled in each classroom each day?
    2. How much trash is collected from the office each day?
    3. Where does the trash go after it leaves the school?
    4. Does the school have a recycling program?
    5. Does the school buy recycled paper or products?
    6. How can there be a cut-back in making trash?

g. Stress to the students the importance of accurate reporting on their findings. Record the information collected on sheets of butcher paper.

h. Have the students draw posters to place around the school to promote trash reduction and recycling.

i. Set up recycling cans in your school for an on-going recycling program in your school. Contact other community recycling groups.

2. **Activity II: "Model Landfill"**

a. Use heavy duty scissors to cut liter bottles into two halves. Tape the edges if they are sharp or rough.

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b. The student will then write his/her name on a piece of tape on the upper half of the container with a permanent ink pen. This is the end with the pour spout.

c. The student will plug the pour spout with cotton, a paper towel, or coffee filter.

d. The student will create a landfill by alternating garbage with soil.

e. Line the bottom of the container with soil, and set the top portion into the bottom.

f. Use a large spoon to add one of the pollutants, such as plastic spoon pieces, food bits, vegetable oil, or foil, and then cover it with soil.

g. Continue layering soil and garbage until all types of items have been included.

h. Have each student observe the landfill for 10 days recording observations on the student sheet. If oil is observed, that is harmful chemicals or oil which could seep into underground water supplies.

i. During the observation period, sprinkle each landfill with water every other day to keep them damp.

j. After 10 days the students will dump out the contents of their landfills onto newspapers. Suggestion: Do this activity outside!

k. Using a stick to prod around the dirt, the students will observe any changes. The foil, plastic, and styrofoam will not have changed (decomposed), but the fruits and vegetables will probably have begun to decompose. Did a syrupy liquid form during decomposition?

l. Ask, "Why did some items change and some not?" (Some are biodegradable; some are not.)

m. Ask, "What kinds of harmful things are in garbage?"

n. Ask, "Is it safe to touch rotting garbage?", "Why not?", "Is it safe to drink water with a couple of drops of the syrupy liquid in it?", "Why not?"

3. Activity III: "The Three R's"

a. Materials:
The Three R's Chart
Samples of common disposable products (camera, razor, nonrefillable pens, paper diapers, lighters).

b. Vocabulary:
Reduce: to lessen consumption of materials in extent or amount.
Reuse: to use again.
Recycle: to recover useful materials from garbage or waste to reprocess into a new product.

c. Explain that one way to help conserve the environment is by reducing the amount of things people buy. Tell how a disposable ballpoint pen or razor can be replaced by a refillable pen or a reusable razor.

d. Reducing can also mean using less, such as using part of a piece of paper for a short note, rather than a whole piece.

e. Items that can be used over again are good choices: cloth rags instead of paper towels, cloth napkins rather than paper ones. Reusing products in other ways is recycling: using old sheets as cleaning rags, old cloth for quilts

f. Reusing also means to pass no longer needed items to other people.

g. Recycled aluminum cans, steel cans, plastic, newspapers, cardboard, plastic bottles, cartons, glass bottles, and glass jars can be reprocessed and made into new items.
Recycling also means buying recycled products.

h. Give each student a work sheet of "The Three R's" and keep a record of their behaviors.

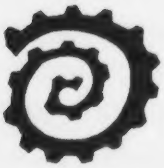
Resources:

Minor, Marz and Nono, The American Indian Craft Book, University of Nebraska Press, Lincoln, 1972, pp. 95, 15.

Recycle, Conserve, Protect: an environmental education teacher's guide, Pacific Gas and Electric Company, Community Relations, 77 Beale Street, San Francisco, Ca 94106.

LESSON PLANS/SCHEDULE FOR EARTH, AIR, WATER AND FIRE UNIT:

My Ideas for Earth, Air, Water and Fire Unit:



Music & Dance

TEACHER'S/PARENT'S BACKGROUND INFORMATION-

Music: Tool to Pride in Indian Heritage

Dr. Louis Ballard, American Indian composer, said, "It is possible for everyone to participate in music either as a performer or as one of the technicians who make it possible. The teacher is a most important person in this situation."

"I want teachers to innovate... to use their imaginations... to explore the possibilities of using Indian music in the classroom... whether it's music, history, English, woodworking, whatever it may be. Bring Indian music in the classroom at one time or another, either as a listening, singing, rhythmic, phonetic movement in dance or simply an appreciation experience. But there should be music available at all times," he said.

If you are an Indian, you should know at least five songs... It is important because it is part of your tools, your resources; it's part of your pride in yourself and part of the education of America..."

Dr. Ballard said that the best resources for acquiring a knowledge of music are the older generation in the community and tribal singers. "And you must not go to them and say, 'Sing me this song.' You have to evolve certain ways of ingratiating yourself with people..."

"I'm not saying that Indian music is better than any music in the world, but I'll be darned if it is not just as good, you see. And teachers, especially, should feel this way too, because if they don't, then they are imparting prejudice to their youngsters... that says that Indian music is nothing... then there is no pride in that youngster... They have a sensitivity, a beauty that should be utilized in a direction of pride in their heritage, and music is an excellent tool to use for achieving this."

"The tribal music that we have remaining is really at the core of our Indian people who are the crossroads of the educational economic potential. And the Indian youth will inherit a legacy of pride and relevance or a legacy of ignorance and exploitation – depending upon you, the educator, the so-called cultured person. Misconceptions about Indian music and other aspects of our culture are abundant both in our schools and in the minds of the general public. These half-truths are defaming and detrimental to the true image of the Indian..."

"... There is a great deal of material within our tribal lives to work from. The Indian singers, especially the head singers, are vital encyclopedias on archives of material. The death of a head singer is like a museum burning down because here are people who have carried on the vocal, oral traditions, non-written epic poetry in music and drama that our forefathers had..."

"Creative potential in Indian music and the related arts of music composition and traditional dances can offer unlimited avenues for self-expression as well as an expansion of our present educational approach… All schools in this country should be doing Indian folk dances."

"Suppose 200 years from now… a stranger comes to these shores and approaches the average man on the street and asks him to sing his favorite folk song. It is my hope that that man in this country will respond with an American Indian folk song," Ballard said.

> -Dr. Ballard's presentation at the 8th Annual NIEA Convention included in *American Indians: Performing Arts,* ORBIS Associates, Washington, DC, 1986.

Music continues to be one of the most identifiable expressions of American Indian culture. It is a vital means of self-identity and cultural perpetuation among Indian people. Additionally, it is a common feature by which non-Indians recognize and acknowledge Indian culture.

Indian students can benefit from a basic orientation to this rich aspect of their cultural heritage. Because nearly every aspect of life in Indian communities was and, in many cases, still is touched by music, there are many cultural and historical "lessons" available in the study of even a single song. The study of music can:

> serve as a stimulus for improved self concept and ethnic pride,
>
> be an effective way to involve broad cross-sections of the community in educational programs,
>
> contribute to the perpetuation of culture, and
>
> provide excellent educational opportunities for improving analytical, comparative, and critical thinking skills among students.

The twentieth century has brought an even wider variety of musical practices into Indian life. Today, virtually every genre of music includes Indian performers. Country, bluegrass, folk, "chicken scratch," classical, swing, rock, and gospel are some of the traditionally non-Indian areas into which Indian performers have ventured. And yet, there is usually some aspect of these performers' art which remains uniquely Indian—the politically minded lyrics of country and folk singers, Floyd Westerman and Buffy Sainte-Marie, the urban concerns of Indian rock group XIT, and the traditionally-influenced modern classicism of Louis Ballard. Culture is not static, it changes and evolves. While the traditions of the past are important, it is just as important to be able to grow and to explore new creative expressions as Indian people. -from *Using American Indian Music in Cultural Instruction,* ORBIS Associates, Washington, DC.

SUGGESTED PRIMARY LEVEL UNIT – MUSIC AND DANCE

Reading, Language Arts, Science, Math, Art, Values	**Literature – Week 1**	**Literature – Week 2**
P Music and Dance Words	*Powwow Summer* by Marcie Rendon	*Britney Spears* by Ann Gaines
H Reading Nonfiction		
A Critiquing Powwow Lit.		*Gloria Estevan* by Fernando Gonzales
S Reading Biographies	*Drumbeat Heartbeat: Celebration of the Powwow* by Susan Braine	
E Write About Favorite Singers		
Singing Powwow Songs		*Duke Ellington: the Piano Prince* by Andrea D. Pinkney
F Science of Sound		
I Cost of Traveling to Powwows		
V Make Article for Outfit	*Powwow Photographs* by Mike Marra	*Leonard Bernstein* by Mike Venezia
E Respect and Generosity		
P Music and Dance Words	*Eagle Drum: on the Powwow Trail with a Young Grassdancer* by Robert Crum	*Tap Dance Recital* by Barbara Steadman
H Reading Nonfiction		
A Critiquing Powwow Lit.		*Song and Dance: Poems* by Lee Bennett Hopkins
S Reading Fiction/Responding		
E Try Different Dances		Dancing Pants - Silverstein
Singing Bottles Activity	*Lakota Hoop Dancer* by Lefthand Bull & Haldane	*Arthur Rocks with Binky* by Mark T. Brown
F Sing Powwow Songs		
O Approx. Cost of Outfit		
U Make Article for Outfit	*Shannon: An Ojibway Dancer* by Sandra King	*Madison Finds a Live Jitterbug* by Sunny Warner
R Integrity and Respect		
P Music and Dance Words		*Frank was a Monster Who Wanted to Dance* by Keith Graves
H Reading Nonfiction	*Powwow* by George Ancona	
A Critiquing Powwow Lit.		
S Reading Fiction		*The Little Band* by James Sage
E Retelling and Responding	*The Fancy Shawl Dancer* by Gerald Mirra	
Powwow and Other Music		Rock'n Roll Band - Shel Silverstein
T What Makes Sound		
H Singing Powwow Songs	*The Hoop of Peace* by Jan Havnen-Finley	*Song and Dance Man* by Karen Ackerman
R Cost to Make Shawl/Hoops		
E Make Article for Outfit		*Moses Goes to A Concert* by Isaac Millman
E Integrity and Respect		
P Music and Dance Words		*Thump, Thump, Rat a Tat Tat* by Gene Baer
H Reading Powwow Stories	*A Trip to a Powwow* by Richard Red Hawk	
A Reading Other Music Stories		*Big Bird's Band Plays Together*
S Sharing Powwow Experiences		
E Hearing Different Sounds	*Powwow ABC* by Sandy Hummingbird	
Cost of Powwow/Other Tapes		*The Old Man Who Loved to Sing* by John Winch
T Singing Powwow Song		
W Making Article for Outfit	*Jingle Dancer* by Cynthia L. Smith	*Grandpa's Song* by Tony Johnston
O Dignity and Respect		

Literature – Week 3	**Literature – Week 4**	**Reading, Language Arts, Science, Math, Art, Values**
Maria Tallchief by Heidi E. Erdich *Maria Tallchief, Prima Ballerina* by Vee Browne *Maria Tallchief: America's Prima Ballerina* by Rosemary Wells	*The Nutcracker* by Carin Dewhirst *Ballet* by Annabel Thomas *Angelina Ballerina* by Helen Craig *Lili at Ballet* by Rachel Isadora	Music and Dance Words Reading Biography Comparing and Contrasting Reading Nonfiction Reading Fiction/Responding Cost of Dance Lessons Indian Dancer(s) Visit Class Write Story of Local Dancers Write Story of Your Courage Courage and Integrity
The Rabbit Dance in *Keepers of the Animals* by Caduto/Bruchac The Deer Dance in *Keepers of the Animals* by M. Caduto and J. Bruchac Butterfly Boy in *Old Father Story Teller* by Pablita Velarde	*Coyote Concert on a Full Moon Night* by C.Whelihan-Scherer *Animal Music* by Harriet Ziefert *The Song of Six Birds* by Rene Deelefs *The Animals' Song* by David Harrison	Music and Dance Words Reading Legends/Fables Retelling/Oral Tradition Draw Animal Dancers Figure Purchase of Tapes Tape/Listen to Bird Songs Other Sounds in Nature How Sound Travels Describing Nature Sounds Respect for Nature/Dance
Dancing Drum: A Cherokee Legend by Terri Cohlene *Nanabosho Dances* by Joe McLellan *Grandfather Drum* by Ferguson Plain	*Nathaniel's Violin* by Allison Lohang *Nana Hannah's Piano* by Barbara Bottner *The Old Musician* by Rita Tornqvist *The Fiddler of the Northern Lights* by Natalie Kinsey Ourchestra-Silverstein	Music and Dance Words Reading Legends Retelling/Oral Tradition Reading Fiction Retelling/Responding Discuss Powwow Prize $ Sound from a Drum Classroom Band Musician Visits Class Make Miniature Drum We Have Gifts/Talents
Love Flute by Paul Goble *The Hunter and the Woodpecker* by C. Crowl The First Flute in *Keepers of the Animals* by Caduto/Bruchac *The Flute Player* by Michael Lacapa	*The Flute Concert* by Wolf Harranth *The Flute Player* by Robyn Eversole *J.B.'s Harmonica* by John Sebastian *Little Boy with a Big Horn* by Jack Bechdolt	Music and Dance Words Reading Legends Reading Fiction Retelling/Responding Playing Recorders/Harmonicas/Cost What Makes Sound Have Flute/Harmonica Player Visit Class Love/for Each Other

ABOUT THE LITERATURE FOR PHASE FIVE –

Music and dance are important parts of Indian culture. Powwows are held on weekends in the summer and other times throughout the year. Indian people participate in other forms of American music and dance.

Powwows-

Powwow Summer* by Marcie Rendon (**Indian Author), Carolrhoda Books, 1996.
Drumbeat Heartbeat: Celebration of the Powwow* by Susan Braine (Indian Author**), Lerner Pub., 1995.
**Powwow Photographs* by Ben Marra, Henry N. Adams, 1996.
These books describe powwows and contain beautiful pictures of powwow dancers. Students should compare their own experiences at powwows with what is described in these books and critique the books.

Other Music Makers-

**Britney Spears* by Ann Gaines, Mitchell Lane Pub., 1999.
**Gloria Estevan* by Fernando Gonzales, Millbrook Pr., 1994.
**Duke Ellington: the Piano Prince* by Andrea D. Pinkney, Disney Press, 1998.
**Leonard Bernstein* by Mike Venezia, 1997.
These stories are about famous American music makers. The idea is to explore other music of America.

Maria Tallchief-

**Maria Tallchief* by Heidi E. Erdich, Native American Stories.
Maria Tallchief, Prima Ballerina* by Vee Browne, (Indian Author**), 1995.
**Maria Tallchief: America's Prima Ballerina* by Rosemary Wells, Viking, 1999.
These books are about Maria Tallchief, the **Osage** prima ballerina. At least two of them should be used and they should be compared and contrasted.

Ballet –

**The Nutcracker* by Carin Dewhirst, 1997.
**Ballet* by Annabel Thomas, 1987.
**Angelina Ballerina* by Helen Craig, 1983.
**Lili at Ballet* by Rachel Isadora, Paper Star, 1993.
These books are about ballet and ballerinas.

Gifted and talented students should read the more difficult selections and report on them to the class or help the teacher read them to the other students. Be sure to have Indian culture staff or other knowledgeable people from the community involved in art/craft/singing projects.

ABOUT THE LITERATURE FOR PHASE FOUR-

Music and dance are important parts of Indian culture. Powwows are held on weekends over the summer and at other times during the year. Indian stories are sometimes about dancing and dancers.

Powwows-

***Eagle Drum: on the Powwow Trail with a Young Grassdancer* by Robert Crum, Four Winds Press, 1994.
Lakota Hoop Dancer* by Lefthand Bull (Indian Author**) and Haldane, Dutton.
Shannon: An **Ojibway Dancer* by Sandra King (**Indian Author**), Lerner, 1995.
These are stories of Indian dancers and powwows. Students should compare their own powwow experiences with those in the books and critique the books.

Other Music and Dances-

**Tap Dance Recital* by Barbara Steadman, Dover, 2000.
**Song and Dance: Poems* by Lee Bennett Hopkins, 1997.
*Dancing Pants in *Where the Sidewalk Ends* by Shel Silverstein, Harper and Row, 1994.
**Arthur Rocks with Binky* by Mark T. Brown, Little Brown and Co., 1998.
**Madison Finds a Live Jitterbug* by Sunny Warner, Houghton-Mifflin, 1999.
These stories refer to other forms of American music and dance.

Animal Dance Legends-

*The Rabbit Dance in *Keepers of the Animals* by M. Caduto and J. Bruchac (**Indian Author**), Fulcrum Pub., 1997. **Mohawk**
*The Deer Dance in *Keepers of the Animals* by M. Caduto and J. Bruchac (**Indian Author**), Fulcrum Pub., 1997. **Yaqui**
*Butterfly Boy in *Old Father Story Teller* by Pablita Velarde (**Indian Author**), Clear Light Pub., 1989. **Pueblo**
These are Indian legends about animals and their influence on dance. Also, *All On Earth, Musical Companion to Keeper Books,* performed by Michael Caduto.

Animal Music and Song –

**Coyote Concert on a Full Moon Night* by Carol Whelchen-Scherer, Norothwood Pr., 1998.
**Animal Music* by Harriet Ziefert, Houghton Mifflin, 1999.
**The Song of Six Birds* by Rene Deelefs, Dutton, 2000.
**The Animals' Song* by David Harrison, Boyds Mill Pr., 1997.
These are stories about how animals also have music and song. Gifted and talented students should read the more difficult selections and report on them to the class or help the teacher read them to the other students. Be sure to have Indian culture staff or other knowledgeable people from the community involved in art/craft/ singing projects.

ABOUT THE LITERATURE FOR PHASE THREE-

Music and dance are important parts of Indian culture. Powwows are held on weekends in the summer and at other times during the year. Indian stories are sometimes about music and dance.

Powwows-

***Powwow* by George Ancona, Harcourt, Brace Javonovich, 1993.
**The Fancy Shawl Dancer* by Gerald Mirra.
**The Hoop of Peace* by Jan Havnen-Finley, Naturegraph, 1994.
These contain pictures and information about powwows. Students should compare their own powwow experiences with the ones in these books. The last part of *The Hoop of Peace* may be too advanced for this level.

Other Music and Dance-

**Frank Was a Monster Who Wanted to Dance* by Keith Graves, Chronicle Books, 1999.
**The Little Band* by James Sage, 1991
*Rock'n Roll Band in *Light in the Attic* by Shel Silverstein, Harper and Row, 1981.
**Song and Dance Man* by Karen Ackerman, Dragonfly, 1999.
**Moses Goes to a Concert* by Isaac Millman, Farrar Straus & Girroux, 1998.
These are general children's stories about music and dance.

Legends about Music and Dance-

Dancing Drum: A* ***Cherokee* *Legend* by Terri Cohlene, Troll, 1990.
Nanabosho Dances* by Joe McClellan (Indian Author**), Pemmican, 1991. **Ojibwa**
Grandfather Drum* by Ferguson Plain (Indian Author**), Pemmican. **Ojibwa**
These are Indian legends including the drum and tell how the hoop dance started.

Other Stories of Music-

**Nathaniel's Violin* by Allison Lohang, Orca Book Pub., 1996.
**Nana Hannah's Piano* by Barbara Bottner, 1996.
**The Old Musician* by Rita Tornqvist, 1993.
**The Fiddler of the Northern Lights* by Natalie Kinsey-Warnock, 1996.
*Ourchestra in *Where the Sidewalk Ends* by Shel Silverstein, Harper and Row, 1974.
These are general children's books about music makers.

Gifted and talented students should read the more difficult selections and report on them to the class or help the teacher read them to the other students. Be sure to have Indian culture staff or other knowledgeable people from the community involved in art/craft/singing projects.

ABOUT THE LITERATURE FOR PHASE TWO-

Music and dance are important parts of Indian culture. Powwows are held on weekends in the summer and other times during the year. Besides the drum, the flute is another important Indian musical instrument.

Powwows-

A Trip to a Powwow* by Richard Red Hawk (Indian Author**).
**Powwow ABC* by Sandy Hummingbird.
**Jingle Dancer* by Cynthia Leitich Smith, Morrow Jr., 2000.

These are books about powwows. Students should compare their own powwow experiences to those described in these books.

Other Music and Song-

**Thump, Thump, Rat a Tat Tat* by Gene Baer, 1991.
**Big Bird's Band Plays Together,* 1999.
**The Old Man Who Loved to Sing* by John Winch, 1998.
**Grandpa's Song* by Tony Johnston, 1991.

These are general children's books about music and song.

Indian Flutes-

Love Flute* by Paul Goble. **Lakota Also on audio tape.
The Hunter and the Woodpecker* by C. Crowl, Tipi Press. **Lakota
*The First Flute in *Keepers of the Animals* by M. Caduto and J. Bruchac (**Indian Author**), Fulcrum Pub., 1997. **Lakota**
The Flute Player* by Michael Lacapa (Indian Author**), Northland Press. **Apache**

The first three books tell the Lakota legend of how the flute came to be. The last is an Apache legend.

Other Flutes and Air Instuments-

**The Flute Concert* by Wolf Harranth, Blackbirch Mktg., 1998.
**The Flute Player* by Robyn Eversole, Orchard, 1995.
**J.B.'s Harmonica* by John Sebastian, 1993.
**Little Boy with a Big Horn* by Jack Bechdolt, Golden Books, 1999.
These are general children's books about air instruments.

Be sure to have Indian culture staff or other knowledgeable people from the community involved in art/craft/singing projects.

FURTHER RESOURCES FOR MUSIC AND DANCE UNIT-
These materials can be used to substitute for books in the suggested unit outline or for additional reading/other activities for students.

The Cat in the Hat Songbook by Dr. Seuss, Random House, 1993.

*The Musical ABC Book by Judith Stuchly, Straight Edge Inc., 1997.

*Scott Gustafson's Animal Orchestra: A Counting Book by Scott Gustafson, 1996.

Frog Went a Courtin': A Musical Play in Six Acts by Dominic Catalano, 1998.

*I Make Music by Eloise Greenfield, Writers and Readers, 1991.

1, 2, 3 Music by Sylvie Auzary-Luton, Orchard Books, 1999.

I Like the Music by Leah Komaiko, Harper Trophy, 1989.

The Fabulous Song by Don Gilmore, Kane/Miller Book Pub., 1998.

Gonna Sing My Head Off by Kathleen Krull, Knopf, 1995.

*Bear's Big Band by Kiki Thorpe, Readers Digest, 2000.

*Out and About Books: Dancing Class by Helen Oxenburg, Puffin, 1993.

*Shall We Dance by Carol Niclaus, 2000.

Dance Away by George Shannon, 1998.

Dancers and the Dance: Stories by Summer Brenner, 1990.

Harriet's Recital by Nancy Carlson, First Ave Editions, 1997.

Pamela's First Musical by Wendy Wasserstein, 1996.

Gabriella's Song by Candace Fleming, 1997.

Loudmouth Joe and the Cornet by Nancy Carlson, Carolrhoda, 1983.

The Cello or Mr. O by Jane Cutler, Dutton, 1999.

Fiddlin' Sam by Mariana Dengler, Rising Moon, 1999.

Rosie's Fiddle by Phyllis Root, 1997.

The Gum on the Drum by Barbara Gregorich, School Zone Pub., 1993.

The Bat Boy and His Violin by Gavin Curtis, Simon and Schuster, 1988.

*Old MacDonald's Musical Farm by Judith Stuchly, 1998.

Forest Singer by Sylvia Sikundar, Barefoot Books, 1999.

The Animal Orchestra by Nick Sharratt, 1997.

Mockingbird by Allan Ahlberg, 1998.

Satchmo's Blues by Alan Schroeder, Yearling Books.

The Blues of Flats Brown by Walter D. Myers, Holiday House, 2000.

The Dance by Richard Evans, Simon & Schuster, 1999.

Isadora Dances by Rachel Isadora, Puffin, 2000.

Nina, Nina Star Ballerina by Jane O'Connor, Grosset & Dunlap, 1997.

The Best Book of Ballet by Angela Wilkes, Larousse Kingfisher Chambers, 2000.

The Nutcracker Ballet by Deborah Hautzig, Random House, 1992.

A Young Person's Guide to Ballet with music on CD by Anita Ganeri.

*Ballerina Bear by Shana Corey, Random House, 2000.

*One Ballerina Two by Vivian French, Lothrop Lee and Shepard, 1991.

10 Ballet Fun Books: Stickers, Paper Dolls, Stencils and More, Dover, 1999.

Ballet Stickers and Ballet Sticker Activity Book by Barbara Steadman, Dover, 1999.

Let's Dance by George Ancona, Morrow Jr., 1998.

The Buffalo Dance by Nancy Van Laan. **Blackfeet**

Native Artists of North America by Reavis Moore.

The Praying Flute by Tony Shearer, Sun Publishing Co., 1975. **Indian**

Pow-Wow by Adolph Huntry Wolf, **Indian Author**. **Indian**

Powwow Country by Chris Roberts, American & World Geography Pub., 1992. **Indian**

People of the Circle by Chris Roberts. **Indian**

We Dance Because We Can by Ben Conteras and Diane Bernstein. **Indian**

Within the Circle, **video** for learning about powwows, narrated by Ford Ashley. **Indian**

Into the Circle, An Introduction to **Native American** Powwows by Full Circle. **Video**

On the Powwow Trail by Chad Killscrow and Chris Roberts. **Indian Video**

Children's Atlas of **Native Americans**, Rand McNally.

Powwow Trading Cards by Chris Roberts available from Four Winds **Indian** Books.

Wacipi, Presenting the **Sioux** Powwow.

Native American Men's and Women's Dance Styles by Scott Swearington and Sandy Rhoades. **Video**

Powwow **tapes and CDs** available by many different singing groups. **Indian**

Flute music **tapes and CDs** available for different Indian flute players. **Indian**

Indian Dancers Coloring Book by O.T. Branson, Treasure Chest, 1999.

Powwow by June Behrens. **Indian**

American **Indian** Festivals, a True Book by Jay Miller, 1997.

A **Haida** Potlatch by Ulli Steltzer, University of Washington Press, 1984.

Special Powwow Edition by **Indian** Country Today Newspaper, Indian Country.com

Native American Dance: Ceremonies and Social Traditions by C. Heth, Smithsonian.

CHECK YOUR LIBRARY OR BOOKSTORES FOR OTHER BOOKS RELATING TO THE TOPIC.
***These books are especially suitable for Phase One – for preschool children.**

MUSIC AND DANCE WORDS

Beginning Sounds-

band
bustle
bells
ballet
beat
buckskin
beadwork
belt
braids
blanket
roach
rap
recorder
regalia
rock and roll
round dance

contest
cornet
composer
camp
corn soup
category
celebration
circuit

guitar
giveaway
gourd dance
golden age
grounds
grand entry
grass dance

fancy dance
fan
feathers
flute
flag song
fringes
fry bread

headband
hoop dance
honor song
honor guard
harmonica
headdress

sing
singer
song
sneak up
special
step
star quilt
straight dance

drumstick
dance
dance stick
donation
drum
drum group

partner
powwow
piano
Pendleton
play
prize
princess
plume

music
musician
moccasins

tap
tape
tent
tuba
tiny tots
traditional
trick song
teen
junior
jingle dress
judge
jingle dance
jingles
visitor
vendors
veterans

Long Vowel Sounds-
braids
roach
bead
beat
sneak up
straight dance

Exceptions-
headdress
fry bread
feathers

Short Vowel Sounds-
band
fan
camp
rap
tap
drum
bustle
buckskin
judge

Ending Sounds-
feather
arbor

announcer
visitor
recorder
composer
singer
dancer

OU Sounds-
announcer
outfit
round dance
grounds
loud
soup
group
gourd

Compound Words-
beadwork
quillwork
headband
headdress
buckskin
warbonnet

Other Words-
adult
Indian tacos
leggings
orchestra

exhibition
arena
emcee

Other Ending Sounds n, l and k-
corn, celebration, fan, donation, Pendleton, musician
rock and roll, special, intertribal, shawl
sneak, beadwork, trick, stick

Word walls should be maintained. Instructors should ensure that students know the meanings of all of these words in this context and extend vocabulary by noting how they may mean other things in other contexts or they may have homophones. Experiences, pictures and student illustrations should be used to explain and process word meanings. Words that rhyme with these words can be examined to extend vocabulary and to see varying spellings for sounds. Other words should be added.

SCIENCE STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN MUSIC AND DANCE UNIT –

Standard – Understands the convictions scientists share about the nature of the world and what can be learned about it
Benchmarks-
Understands that science experiments normally have reproducible results: science experiments generally work the same way in different places

Standard- Understands that scientific inquiry works in particular ways
Benchmarks-
Understands that learning can come from careful observations and simple experiments
Understands the importance of careful description in science and how it allows comparison

Standard-Understands basic concepts about the structure of matter
Benchmarks-
Knows that all objects occupy space and have mass
Knows that objects can be described and classified by their composition and their physical properties

Standard-Understands motion and the principles that explain it
Benchmarks-
Knows that the varieties of motion include vibrational
Knows that an object's motion can be changed by a push or pull by people or by other objects
Knows that things that make sound vibrate
Knows that the properties of sound such as pitch and loudness can be altered by changing the properties of its source (a vibrating object)

Standard- Understands the nature of the Chemical Revolution
Benchmarks-
Knows that objects that are alike in some ways may be different in others

Standard- Understands the nature of physical, conceptual, and mathematical models and the uses made of them
Benchmarks-
Knows that many of the toys he/she plays with are like real things only in some ways
Knows that many of the toys he/she plays with are different from real things because they are not the same size, are missing many details, or are not able to do all of the same things
Knows that a model of a thing is different from the real thing, but can be used to learn something about what the real thing is like
Knows that one way to describe something is to say what other thing it is like

Knows that geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, and even stories can be used to represent objects, events, and processes in the real world, although these representations can never be exact in every detail

Standard- Knows about patterns of change and constancy
Benchmarks-
Knows that sometimes making up an experiment helps us to learn more about how something changes
Knows that things change in steady, repetitive, or irregular ways, or sometimes in more than one way at a time, and that a table or graph of observations or measurements often is the best way to tell what kinds of change are happening

MATHEMATICS STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN MUSIC AND DANCE UNIT-

Standard-Effectively uses a variety of strategies within the problem solving process
Benchmarks-
Brainstorms possible things to do
Draws pictures to represent problems
Represents problem situations using physical objects
Clarifies problems using discussions with teacher or knowledgeable others
Uses guess and check to solve problems
Clearly states problems in his or her own words
Checks the reasonableness of results through estimation

Standard-Understands and applies basic and advanced properties of numbers
Benchmarks-
Has a general understanding of the concept of number
Uses counting to exemplify numbers
Understands the relationship of decimals to whole numbers

Standard-Uses basic and advanced procedures while performing the process of computation
Benchmarks-
Adds, subtracts, multiplies, divides whole numbers with accuracy
Adds, subtracts, multiplies, divides decimals with accuracy

Standard-Understands and applies basic and advanced methods of measurement
Benchmarks-
Understands the relationships between length, width and height
Understands the basic features of mass
Makes effective use of ruler and scale for making measurements

LANGUAGE ARTS STANDARDS AND BENCHMARKS FOR PRIMARY GRADES ADDRESSED IN MUSIC AND DANCE UNIT -

Standard – Gathers information effectively through reading, listening and viewing
Benchmarks –
Provides an accurate retelling of the basic plot of simple stories the student has read, heard or viewed
Provides an accurate retelling of the main idea of simple expository information the student has read, heard or viewed
Understands that reading, viewing and listening are ways of gaining information about the world
Determines meaning of simple words from context
Creates mental representations for concrete information read, heard or viewed

Standard – Reads and responds to literature
Benchmarks –
Understands that stories have beginning, middle and ending episodes
Understands the genre of legends and fables

Standard – Communicates ideas and information in writing
Benchmarks –
Understands basic connections between spelling patterns and speech sounds
Understands basic phonological patterns in English
Expresses ideas in simple expository forms
Composes simple stories that express cohesive ideas
Experiments with different genre as modes for expressing ideas

Standard – Understands and applies basic principles of language use
Benchmarks –
Recognizes characteristic sounds and rhythms of language
Makes valid observations about the use of words
Makes valid observations about the use of language at home as opposed to the use of language in school

Standards and Benchmarks from *The Systematic Identification and Articulation of Content Standards and Benchmarks,* Mid-continent Regional Educational Laboratory, 1994.

AMERICAN INDIAN CONTENT STANDARDS FOR PRIMARY GRADES ADDRESSED IN MUSIC AND DANCE UNIT –

SCIENCE

Physical Science-
Indian students should develop an understanding of the innate properties of objects and materials that were (and are) recognized by traditional American Indian cultures in the manufacture and use of specific material objects that capitalize upon those properties.

Earth Science-
Indian students should develop an understanding of properties of earth, air, water and fire and how they served as a basis for traditional American Indian production of clothing, housing, tools, and other objects.

Science and Technology-
Indian students should develop an awareness of the problem solving skills demonstrated by historical American Indians in the development of tools and technologies, such as in the development of musical instruments.

LANGUAGE AND LITERACY

Indian students should be able to –

Listen for meaning and gain information from spoken English and a Native language.

Listen to Indian stories told in the oral tradition, comprehend their teachings and be able to retell them.

Speak coherently, conveying ideas in both English and a Native language.

Read fluently and independently, a variety of materials including those with American Indian themes.

Locate and use a variety of texts to gain information, for example, historical materials about their tribe, tribal legends and stories and oral history transcription.

Be familiar with children's literature with Indian themes, especially with that pertaining to the student's tribe and literature written by Indian authors.

MATHEMATICS

Mathematics as Problem Solving-
Indian students should formulate problems from everyday and mathematical situations within their home and tribal/community worlds.

Mathematics as Communication-
Indian students should realize that representing, discussing, reading, writing, and listening to mathematics are vital parts of learning and using mathematics because it creates holistic instruction akin to a traditional Indian approach to learning.

Mathematics as Reasoning-
Indian students should use models, known facts, properties and relationships to explain their thinking, using objects or ideas from their own or other American Indian cultures.

Mathematical Connections-
Indian students should use mathematics in other curriculum areas by developing their own story problems derived from American Indian themes.

Estimation-
Indian students should explore estimation strategies through activities derived from their cultural worlds.

Number Sense and Numeration-
Indian students should construct number meanings through real-world experiences and use of physical materials.

Concepts of Whole Number Operations-
Indian students should develop meaning for the operations by modeling and discussing a rich variety of problem situations including some from the Indian world.

Whole Number Computation-
Indian students should use a variety of mental computation and estimation techniques in solving problems related to Indian cultural themes.

Measurement-
Indian students should understand the attributes of length, capacity, mass, and volume and relate these measures to use in their own cultural, home, tribal or community worlds.

Fractions and Decimals-
Indian students should apply fractions and decimals by applying them to real world situations using Native cultural experiences.

American Indian Content Standards, ORBIS Associates for Office of Indian Education Programs, Bureau of Indian Affairs, United States Department of the Interior, 1996.

Example Activities Developed by Teachers of American Indian Students

Workshop on Culturally-Based Math and Science Curriculum Development
Haskell Indian Junior College
1992

MASTERS Project
Math and Science Teachers for Reservation Schools
University of Kansas and
Haskell Indian Nations University
Earth's Caretakers, 1993

Ideas should be adapted for appropriateness. See appendix for how to order Earth's Caretakers.

SCIENCE --

"THE BEAT GOES ON"

CULTURAL OUTCOME: VII
SCIENCE OUTCOMES: II, V

CULTURAL OBJECTIVE:

Students will understand why drums were used for many different reasons in Native American cultures.

SCIENCE OBJECTIVES:

Students will:

understand how sounds are produced and travel through matter

use observation skills

communicate by using scientific vocabulary

make simple predictions

make inferences from data and observations

analyze data.

TEACHER'S BACKGROUND INFORMATION:

The drum is an intricate part of life for many Native Americans. Singing with the use of a drum is a serious matter for Native Americans; for them, the drum plays from birth until death.

The drum adds to the happiness and welfare of the Indian in many ways. Drum sounds are for all of the important events in Native Americans' lives - ceremonies, war, hunting, and pleasure. Drum sounds can be used to make the people feel happy or sad, as well as to warn them of danger. Of course, the drum is also used for accompaniment to singing. The singer provides the melody and the drum provides the rhythm.

A drum can make a number of different sounds. When an object vibrates, waves of the surrounding air are picked up by the ear and are known as sound. The pitch, high or low sound, is determined by how fast the waves vibrate. Rapidly moving waves make a high pitch. Variations in volume are caused by the height of a sound wave. Sound travels slowest through a gas, faster in a liquid, and fastest through a solid because of the distance between the molecules of the substance. A sound conductor, such as air, lets the sound waves move freely. An echo is caused by a sound which bounces back from an object or objects.

STUDENT LEARNING ACTIVITIES:

1. Singing Bottles:

   Provide four small identical glass bottles. Put different amounts of liquid into each bottle. Using a small wooden dowel, tap each bottle gently in succession. Record your observations. What did you notice about the different sounds? Tap an empty bottle. How does it sound? What makes the sounds different? Record your answers.

2. What Causes Sound?

   a. Measure a piece of monofilament fish line 20 inches long. Tie a 4 inch piece of dowel to each end.

   b. Put a shoe box on the edge of a table or desk.

   c. Remove the lid, make a hole in one end of the box with your pencil, thread the fish line through the hole, and secure it with a toothpick.

   d. Put the lid on the box and stretch the fish line lengthwise across the top of the box. Put one dowel under the fish line near one end of the lid.

   e. Slowly pull down on the dowel and pluck the fish line. What do you hear? What do you see?

   f. As you pluck the line, pull down on the dowel to stretch it tighter. Watch and listen. What do you hear? What do you see? Try to play a simple tune. What might happen if you cut a hole in the lid of the shoe box? Try it.

3. Traveling Sound

   a. Cut two pieces of string 20 inches long.

   b. Tie the string to the wide ends of a wire coat hanger.

   c. Hold the ends of the strings and hit the hanger against a solid object. Listen to the sound it makes.

   d. Wrap the ends of the string twice around each of your index fingers. Put your fingers in your ears and tap the hanger on the solid object again.

   e. What happened? What can you say about this?

   When struck without the fingers in the ears, the hanger will sound flat and metallic. When the fingers are placed in the ears, the sound will be a loud gong because sound travels better through the relatively solid string than through the air.

4. Making a drum:

   Use a three-pound metal coffee can, an oatmeal box or a number ten food can as the base of the drum. Cut a large balloon in half and stretch it tightly over the cut out end of the container. Fasten with a rubber band or string. Tap on the drum head with a small dowel stick. How can you change the pitch of your drum? How can you change the volume of your drum? Predict what happens if you change the type of material on the head of your drum? Record your findings. How can you change the base of your drum? What do you predict will happen to the sound? Record this information. Experiment to find your best combination to make the loudest drum. Demonstrate your findings.

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EVALUATION:

1. Have the students join three or four of their classmates in making a drum "band." Each student's drum must make a different sound.
2. Have each group explain to the class how their sounds were made.

RESOURCES:

Coleman, Satis N.. The Drum Book. New York: The John Day Company, 1931.

Densmore, Frances, A M. The American Indians and Their Music. New York: The Woman's Press, 1926.

Discover the Wonder. Glenview, Illinois: Scott Foresman Science Division of Harper Collins Publishers, 1989.

Hofsinde (Gray-Wolf), Robert. Indian Music Makers. New York: William Morrow and Company, 1967.

Tolman, Marvin N. and James O. Morton . Physical Science Activities for Grades 2-8. West Nyack, New York: Science Curriculum Activities Library, Parker Publishing Company, Inc., 1986.

DEVELOPED BY:

Nancy L. Roehl

MATH --

"POW WOW TRAILS"

CULTURAL OUTCOME: IX
MATH OUTCOME: VII

CULTURAL OBJECTIVES:

Students will:

gain a knowledge of various tribes and reservations within the United States

generally understand the meaning of Pow Wow.

MATH OBJECTIVES:

Students will:

know how to use whole numbers, fractions, and decimals in making estimates

develop mapping skills and apply computation skills in determining mileage and cost of travel.

TEACHER'S BACKGROUND INFORMATION:

Pow Wow is defined as a ceremony especially for the constraining of spirits by invocation of a sacred name or by a spell. Often practiced with feasting, dancing, etc. by Indians for the cure of diseases, for success in hunting or war and other purposes. It is also a conference or social gathering.

Students will be taught how to use a map scale to measure distance on a map. They will learn how to figure out gas mileage and traveling costs attending a Pow Wow on the various Indian Reservations throughout the United States. Provide a map of the United States with Indian Reservations on it.

Distance = Rate x Time (D = R x T) This formula will be used to estimate time of arrival.

Example of figuring mileage:

250 miles	Mileage reading on odometer after trip
-140 miles	Mileage reading on odometer before trip
110 miles	Number of miles traveled

Divide the total miles traveled by the number of gallons of fuel used to calculate the miles per gallon.

STUDENT LEARNING ACTIVITIES:

1. Follow a Pow Wow trail by using one of the three following calenders of events. Decide which Pow Wow will be attended for that weekend.

2. Choose a car, van, or truck, economical or gas guzzling, compact or roomy.

   Student will use the gas mileage for chosen vehicles to figure out traveling costs. Choose a route that is the shortest for a map or atlas. Use the given formula on the cost sheet. Mileage will be logged on the data sheet provided.

3. Venture out to the various Pow Wows from the calender chossen. Go from Pow Wow to Pow Wow. Leave one Pow Wow and just continue on to the next destination.

4. Choose between a life of luxury by staying in a motel or roughing it by camping at the Pow Wow grounds. Use the list of motel costs and meal cost from the cost sheet provided. Expenses will be logged on the data sheet.

5. Include an automatic $5.00 weekend button fee for each Pow Wow attended.

6. Calculate the total cost of his/her Pow Wow trail. Totals should be under the $1,000.00 limit.

HAPPY TRAILS TO YOU!!!!

POWWOW EXPENSES

Gas costs	$1.20
Economy Car	30 miles/gallon
Luxury Car	20 miles/gallon

MILEAGE:

$$\frac{\text{total miles traveled}}{\text{car's miles/gallon}} = \text{total gallons used}$$

For example, if you used the economy car and traveled 60 miles, you use 2 gallons.

The cost of traveling to the POW WOW is = total gallons used **X** gas cost.

2 gallons **X** $1.20 = $2.40

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Snacks........$2.00

LUXURY
Breakfast.....$8.00
Lunch.........$12.50
Supper........$25.00
Snacks........$4.50

JUNE, 2000

- **Intertribal Pow Wow:** June 1-2, West of Rio West Mall, Gallup, N.M. Contact 1-800-233-4528.
- **6th Anniversary Mill Bay Casino Pow Wow:** June 1-4, 455 E. Wapato Lake Rod Manson, Wash Contact 1-800-648-2946 ext. 4214.
- **Cowboy Days & Indian Nights Pow Wow:** June 2-3, Page Sports Complex, Page, Ariz. Contact (520) 645-5018.
- **32nd Annual Alabama Coushatta Pow Wow:** June 2-3, Indian Village Ball Park, Livingston, Texas. Contact 1-800-444-3507 or (409) 563-4391.
- **21st Annual Otiningo Pow Wow:** June 2-4, Broome County's Otsiningo Park, Binghamton, N.Y. Contact (607) 729-0016.
- **7th Annual Warroad Traditional Pow Wow:** June 2-4, Warroad City Park, Warroad, Minn. Contact (218) 386-2834.

15th Annual Honoring of the Elders Pow Wow: June 2-4, Santa Clara County Park, Gilroy, Calif. Contact (408) 258-1326.

- **3rd Annual Mininising Honoring our Children Pow Wow:** June 2-4, Detour State Park, Detour, Mich. Contact (906) 484-2921 or (906) 484-3147.
- **Sah Gii Bah Gah Pow Wow:** June 2-4, Pow Wow Grounds, Nett Lake, Minn. Contact (218) 757-3261.
- **9th Annual Veterans Pow Wow:** June 2-4, Tulalip Community Center, Marysville, Wash. Contact (360) 651-4470.
- **Return to Beaver Creek Pow Wow:** June 2-4, Matarazzo Farms, Belvidere, N.J. Contact (908) 475-3671.
- **Big Wind Pow Wow:** June 2-4, Pow Wow Grounds, Crow Heart, Wyo. Contact (307) 332-9106.

Kul-Wicasa Oyate Fair & Wacipi - 1999

- **5th Annual Navajo Song & Dance:** June 3, Ellis Tanners, Gallup, N.M. Contact 1-800-233-4528.
- **Kickapoo Pow Wow:** June 3-4, Grand Village of the Kickapoo Park, LeRoy, Ill. Contact (309) 962-2700.
- **Honor our Elders & Warriors Pow Wow:** June 3-4, Vermillion River , Matthiessen State Park, Ill. Contact (708) 493-0321.
- **19th Annual Yuba-Sutter Pow Wow:** June 3-4, Yuba College, Marysville, Calif. Contact (530) 749-6196.
- **6th Annual NAABC:** June 3-4, Naval Air Station Joint, Horsham, Pa. Contact (215) 369-0581.
- **Occaneechi Saponi Spring Pow Wow:** June 9-10, Downtown Hillsborough, N.C. Contact (919) 732-6512 or (919) 304-3723.
- **Red Earth Festival:** June 9-11, Myriad Convention Center, Oklahoma City, Okla. Contact (405) 427-5228.
- **145th Treaty Day Pow Wow:** June 9-11, Ceremonial Grounds, White Swan, Wash. Contact (509) 865-5121.
- **132nd Annual White Earth Pow Wow:** June 9-11, Tribal Grounds, White Earth, Minn. Contact (218) 983-3285 or (218) 935-2392.
- **34th Annual Will Rogers Indian Club Pow Wow:** June 9-11, Ellis O. Jackson City Park, Marshfield, Mo. Contact (417) 759-2782 or (417) 256-4698.
- **Dance for the Spirit:** June 9-11, Waupaca County Fairgrounds, Weyauwega, Wis. Contact (920) 867-2647 or (920) 884-1080.
- **Homecoming of the Three Fires Pow Wow:** June 10-11, Riverside Park, Grand Rapids, Mich. Contact (616) 458-8759.
- **Connecting our Spirits:** June 10-11, Middlesex Fairgrounds, Westford, Mass. Contact (617) 884-4227.
- **9th Annual Honoring our Veterans Pow Wow:** June 10-11, Bay Mills Softball Field, Brimley, Mich. Contact (906) 248-3715 or (906) 248-3241.
- **Return to Pimiteoui Pow Wow:** June 10-11, W.H. Sommer Park Peoria, Ill. Contact (309) 691-9369.
- **5th Annual Bison Days Pow Wow:** June 10-11, the Zebrovka Buffalo Ranch, Huntingdon, Pa. Contact (814) 643-6915.
- **9th Annual Eskasoni First Nation Pow Wow:** June 15-21, Pow Wow Grounds, Cape Breton, Nova Scotia, Canada. Contact (902) 379-2508 or (902) 379-2591.
- **Kaskaskia River Dance Pow Wow:** June 16-18, Peterson Park, 6th and Broadway, Mattoon, Ill. Contact Patrick Gaines (217) 234-7555.
- **Gateway to the Nations:** June 16-18, Fort Hamilton Military, Brooklyn, N.Y. Contact (718) 686-9297.
- **15th Annual Strawberry Moon Pow Wow:** June 16-18, Campgrounds, Mole Lake, Wis. Contact (715) 478-5106.
- **8th Annual Naes College Pow Wow:**

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Gathering of Nations Pow Wow - 1999

June 16-18, Mather Park, Chicago, Ill. (773) 761-5000.
- **Sullivan County Pow Wow:** June 16-18, Sullivan County Fairgrounds, Forksville, Pa. Contact (570) 924-9082.
- **7th Annual Kaskaskia River Pow Wow:** June 16-18, Peterson Park, Mattoon, Ill. Contact (217) 234-7555.
- **97th Red Bottom Celebration:** June 16-18, Pow Wow Grounds, Frazer, Mont. Contact (406) 768-5557.
- **Iowa Tribal Pow Wow:** June 16-18, Pow Wow Grounds, Perkins, Okla. Contact (405) 547-1091 or (405) 466-3101.

Mohawk Trail Pow Wow: June 17-18, Indian Plaza, Charlemont, Mass. Contact (413) 339-4096.
- **11th Annual Keeping the Traditional:** June 17-18, Massasoit Community College, Brockton, Mass. Contact (617) 884-4227.
- **7th Two Worlds Intertribal Lodge Rendezvous:** June 17-18, Benson Farm, Stanwood, Mich. Contact (616) 344-7111 or (231) 856-4451.
- **19th Plains Indian Museum Pow Wow:** June 17-18, Joe Robby Pow Wow Grounds, Cody, Wyo. Contact (307) 578-4049.
- **9th Annual Grand Celebration:** June 21-25, Grand Casino Hinckley, Hinckley, Minn. Contact 1-800 GRAND-21 ext. 3085.
- **41st Annual Eastern Shoshone Pow Wow:** June 22-25, Pow Wow Grounds, Fort Washakie, Wyo. Contact (307) 332-9106.
- **7th Fort Randall Casino:** June 23-25, Fort Randall Casino & Hotel, Wagner, S.D. Contact (605) 487-7871 or (800) 362-6333.
- **Twin Buttes Celebration:** June 23-25, Pow Wow Grounds, Twin Buttes, N.D. Contact (701) 938-4398.
- **10th Annual First Peoples Pow Wow:** June 23-25, Gibralter Trade Center, Mt. Clemens, Mich. Contact (810) 756-1350.
- **24th Annual Great Lakes Pow Wow:** June 23-25, Hannahville Indian Community, Wilson, Mich. Contact (906) 466-9230.
- **19th Annual AIITCO:** June 24-25, County Fairgrounds, Frederick, Md. Contact (301) 869-9381.
- **12th Coquille Indian Tribe Salmon Bake:** June 24-25, the Mill Resort & Casino, North Bend, Ore. Contact (541) 756-0904.
- **16th Indian Hill:** June 24-25, Indian Hill Ranch, Tehachapi, Calif. Contact (661) 822-1118.
- **39th Annual First Nation Chippewas of Sarnia Pow Wow:** June 24-25, Community Center, Sarnia, Ontario, Canada. Contact (519) 336-8410.
- **28th Annual Oneida Pow Wow:** June 30-July 2, Norbert Hill Center, Oneida, Wis. Contact (920) 490-2452 or 1-800-236-2214.
- **27th Poundmakers Lodge:** June 30-July 2, Poundmakers Lodge, St. Albert, Alberta, Canada. Contact (780) 458-1884.
- **23rd Annual Three Rivers Lodge:** June 30-July2, 13505 Union Road, Manteca, Calif. Contact (209) 858-2421.
- **22nd Red Cliff Pow Wow:** June 30-July 2, Pow Wow Grounds, Red Cliff, Wis. Contact (715) 779-3152.
- **6th Wildhorse Pow Wow:** June 30-July 2, Wildhorse Gaming Resort, Pendleton, Ore. Contact (541) 278-2274.
- **AABITA-NIIBING:** June 30-July 2, Veterans Memorial Grounds, Cass Lake, Minn. Contact (218) 335-8289.
- **Sisseton-Wahpeton Pow Wow:** June 30-July 3, Wacipi Agency Village, Sisseton, S.D. Contact (605) 698-3911.

JULY, 2000

- **Rainbow Dancer Pow Wow:** July 1-2, Rodeo Grounds, New Windsor, Ill. Contact (309) 968-6848 or (309) 382-2779.
- **Munsee-Delaware Nation Pow Wow:** July 1-2, Munsee-Delaware Nation Park, Munsee, Ontario, Canada. Contact (5119) 289-5475 or 1-800-257-7279.
- **28th Calico Dancers Pow Wow:** July 1-2, Moreau Recreation Park, South Glens Falls, N.Y. Contact (518) 793-1693.
- **Mohawk Trail:** July 1-3, Indian Plaza, Charlemont, Mass. Contact (413) 339-4096.
- **128th Annual Quapaw Tribal Pow Wow:** July 2-4, Pow Wow Grounds, Quapaw, Okla. Contact (918) 542-1853.
- **Navajo Fourth of July Pow Wow:** July 4, Fair Grounds, Window Rock, Ariz. Contact (520) 871-6478.
- **37th Annual Sac & Fox Pow Wow:** July 6-9, Tribal Pow Wow Grounds, Stroud, Okla. Contact (918) 968-3526.
- **Southern Wyoming Veterans Day Pow Wow:** July 7-9, Laramie County Community College Arena, Cheyenne, Wyo. Contact (307) 634-7526 or (307) 632-1020.
- **The Great Mohican Indian Pow Wow:** July 7-9, Pow Wow Grounds, Loudonville, Ohio. Contact 1-800-766-2267.
- **Ktaqmkuk Mi'Kmaq Gathering:** July 7-9, Pow Wow Grounds, Conne River, Newfoundland. Contact (709) 882-2470.
- **18th Bear River Anniversary Pow Wow:** July 7-9, Pow Wow Grounds, Lac du Flambeau, Wis. Contact (715) 588-9203
- **26th Tonkawa Pow Wow:** July 7-9, Fort Oakland Pow Wow Grounds, Tonkawa, Okla. Contact (580) 628-2561.
- **Grand Ronde Veteran's Pow Wow:** July 7-9, Pow Wow Grounds, Grand Ronde, Ore. Contact (503) 879-5878
- **Antelope Pow Wow:** July 7-9, Pow Wow Grounds, Mission, S.D. Contact (605) 747-2381.
- **Prairie Island Pow Wow:** July 7-9, 15 miles north of Red Wing, Prairie Island, Minn. Contact 1-800-554-5473.
- **Narragansett Pow Wow:** July 8-9, Crandell Homestead, Westerly, R.I.

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Contact (401) 364-1100.

• **Island In the Sun Pow Wow:** July 8-9, Beausoleil First Nation, Christian Island, Ontario, Canada. Contact (705) 247-2035.

• **37th Annual Sac & Fox Pow Wow:** July 8-9, Pow Wow Grounds, Stroud, Okla. Contact (918) 968-3526.

• **Sussex County Pow Wow:** July 8-9, Sussex County Fairgrounds, Sussex County, N.Y. Contact (718) 686-9297.

• **6th Annual All-Nations Pow Wow:** July 14-16, Los Vaqueros Rodeo Arena, Big Bear City, Calif. Contact (909) 584-7115 or (909) 790-1390 or (510) 465-3267 or (408) 295-9509.

• **7th Fond Du Lac Veteran's Pow Wow:** July 14-16, Mash-Ka-Wisen Grounds, Cloquet, Minn. Contact (218) 879-4593.

• **Honor the Earth Pow Wow:** July 14-16, LCO Reservation, Hayward, Wis. Contact (715) 492-5981.

• **8th Annual North American Iroquois Pow Wow:** July 14-16, Veterans Memorial Park, Salamanca, N.Y. Contact (716) 283-0084.

• **Mandaree Celebration:** July 14-16, Pow Wow Grounds, Mandaree, N.D. Contact (701) 759-3241 or (701) 759-3311.

• **3rd Annual Ishpeming's Pow Wow:** July 14-16, Recreational Area, Ishpeming, Mich. Contact (906) 475-7162.

• **11th Annual Shoalwater Bay Sobriety Pow Wow:** July 15, Shoalwater Bay Casino, Tokeland, Wash. Contact (360) 267-6766.

• **Mee-Gwitch-Mahnomen Pow Wow:** July 15-16, Pow Wow Grounds, Ball Club, Minn. Contact (218) 246-8971.

• **Honor Our Elders Pow Wow:** July 15-16, TBA, Somerset, Mass. Contact (508) 880-6887.

• **34th Annual Stampede & Pioneer Days:** July 15-16, Churchill County Regional Park, Fallon, Nev. Contact (775) 423-3873 or (775) 423-7803.

• **Cow Creek Pow Wow:** July 15-16, South Umpqua Falls, Canyonville, Ore. Contact (541) 672-9405.

• **2nd Annual White Buffalo Society Pow Wow:** July 15-16, Gaston Lions Club Fair Grounds, Gaston, Ind. Contact (765) 396-3609.

• **2nd Circle of Nations Pow Wow:** July 15-16, Meadow Park, Flushing, N.Y. Contact (212) 666-9478.

• **Honoring Our Heritage:** July 15-16, Cross Roads Village, Mt. Morris, Mich. Contact (810) 239-6621.

• **Lake Helen Pow Wow:** July 15-16, across from Lake Helen, Nipigon, Ontario, Canada. Contact (807) 887-2510.

• **30th Annual Lone Feather Council Pow Wow:** July 15-16, Post Field House, Fort Carson, Colo. Contact (719) 495-0798 or (719) 749-2633.

• **Buffalo Pow Wow:** July 17-18, Fruitridge Road, Grand Rapids, Mich. Contact (616) 364-4697.

Gathering of Nations Pow Wow - 1999

• **Keweenaw Bay Indian**

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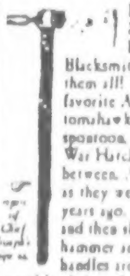

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Community Pow Wow: July 21-23, Ojibwa Pow Wow & Campground, US 41, Baraga, Mich. Contact (517) 353-6623.

- **38th Flandreau Santee Pow Wow:** July 21-23, Pow Wow Grounds, Flandreau, S.D. Contact (605) 997-3891.
- **Bitterroot Valley Good Nations Pow Wow:** July 21-23, Historic Daly Mansion Grounds, Hamilton, Mont. (406) 363-5383.
- **Standing Arrow Pow Wow:** July 21-23, Pow Wow Grounds, Elmo, Mont. Contact (406) 849-5798 or (406) 849-5893.
- **13th Annual Buffalo Days Pow Wow:** July 21-23, Unesko World Heritage Site, Fort Mcleod, Alberta, Canada. Contact (403) 553-2731.
- **Julyamsh Pow Wow:** July 21-23, Greyhound Park, Post Falls, Idaho. Contact 1-800-523-2464 ext. 272.
- **Champion of Champions Pow Wow:** July 22-23, Chiefswood Park, Grand River Reserve, Ontario, Canada. Contact (519) 758-5444 or (519) 445-4391.
- **13th Annual White Mountain Native American Art Festival:** July 22-23, Pinetop-Lakeside, Lakeside, Ariz. Contact (520) 367-4290 or 1-800-573-4031.
- **Mt. Kearsage Indian Museum Pow Wow:** July 22-23, Mt. Kearsage Indian Museum, Warner, N.H. Contact (603) 456-2600 or (603) 456-3244.
- **17th Annual Cherokee of Hoke City Pow Wow:** July 23-24, Rockfish, Davis Bridge, N.C. Contact (910) 875-0222.
- **22nd Annual Thunderbird Pow Wow:** July 28-30, Queens County Farm Museum, Floral Park, N.Y. Contact (718) 347-3276.
- **Crown City Pow Wow:** July 28-30, Dunkirk City Park, Dunkirk, Ind. Contact (765) 768-6462.
- **Honor the Fire Keepers Pow Wow:** July 28-30, Dunn Field, Lake Geneva, Wis. Contact (414) 473-7748 or (414) 248-2784.
- **Ermineskin Pow Wow:** July 28-30, Ermineskin Pow Wow Grounds, Hobbema, Alberta, Canada. Contact (780) 585-3741 or (780) 585-3435.
- **2nd Gagaguwon Pow Wow:** July 29-30, Ausable Children's Park, corner of O'Tool & Harbor, Oscoda, Mich. Contact (517) 739-1994 or 1-800-235-4625.

AUGUST, 2000

- **34th Annual Rocky Boy Pow Wow:** August 3-5, Rocky Boy Reservation, Havre, Mont. Contact (406) 395-4478.
- **Menominee Nation Pow Wow:** August 3-6, Woodland Bowl, Keshena, Wis. Contact (715) 799-5114.
- **Bell Pow Wow:** August 4-5, Pow Wow Grounds, Stillwell, Okla. (918) 696-4480.
- **7th Dakota Wacipi:** August 4-6, Upper Sioux State Park, Granite Falls, Minn. Contact (320) 564-2360.
- **22nd Annual Honoring Sobriety Pow Wow:** August 4-6, Mash ka Wisen Treatment Center, Sawyer, Minn. Contact (218) 879-6731.
- **Long Plain First Nation Pow Wow:** August 4-6, Pow Wow Grounds, Long Plain, Manitoba, Canada. Contact (204) 252-2731 or (204) 252-2369.
- **Oklahoma Indian Nation Pow Wow:** August 4-6, Football Field, Concho, Okla. Contact (405) 262-5708.
- **16th Annual Little Elks Retreat Pow Wow:** August 4-6, Tribal Campgrounds, Mount Pleasant, Mich. Contact (517) 772-5888.
- **Rogue River Gathering:** August 5-6, Riverside Park, Grants Pass, Ore. Contact (541) 474-6394 or (541) 839-6704.
- **Whiteface Mountain Pow Wow:** August 5-6, Whiteface Mountain Ski Area, Wilmington, N.Y. Contact (518) 946-2223.
- **NASAU College Pow Wow:** August 5-6, NASAU College, East Meadow, N.Y. Contact (516) 226-5306 or (718) 978-7200.
- **69th Annual American Indian Expo:** August 7-12, Caddo County Fairgrounds, Anadarko, Okla. Contact (405) 247-6651.
- **79th Annual Gallup Inter-Tribal Pow Wow:** August 9-13, Red Rock State Park, Gallup, N.M. Contact 1-800-233-4528.
- **OMAK Stampede Indian Encampment Pow Wow:** August 10-13, Stampede Arena, Omak, Wash. Contact (509) 826-4218 or 1-800-933-6625.
- **Little Shell Celebration:** August 10-13, Pow Wow Grounds, Newtown, N.D. Contact (701) 627-3634 or (701) 627-3483.

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- **Serpent River Pow Wow:** August 11-13, Pow Wow Grounds, Serpent River, Ontario, Canada. Contact (705) 844-2418.
- **Kul-Wicasa Oyate Fair & Wacipi:** August 11-13, Fairgrounds, Lower Brule, S.D. Contact (605) 473-5561.
- **Big Grassy River Pow Wow:** August 11-13, Pow Wow Grounds, Big Grassy, Ontario, Canada. Contact (807) 488-5614.
- **24th Annual Mohican Veteran's Pow Wow:** August 11-13, Many Trails Park, Bowler, Wis. Contact (715) 793-4394.
- **Nesika Illakee Pow Wow:** August 11-13, Government Hill, Siletz, Ore. Contact 1-800-922-1399 ext. 230.
- **23rd IICOT Champions Pow Wow:** August 11-13, Tulsa State Fairgrounds, Tulsa, Okla. Contact (918) 836-1523.
- **Grand Portage Rendezvous Pow Wow:** August 11-13, Pow Wow Grounds, Grand Portage, Minn. Contact (218) 475-2277 or (218) 475-2653.
- **5th Annual Mihsihkinaahkwa Traditional Pow Wow:** August 12-13, Morsches Park, Columbia City, Ind. Contact (219) 625-4370.
- **Cowasuck Band Gathering:** August 12-13, Parlin Field, Newport, N.H. Contact (508) 528-7629.
- **Spirit of the North Pow Wow:** August 12-13, Shooting Star Casino, Mahnomen, Minn. Contact (218) 846-9749.
- **20th Annual Paumanauke Pow Wow:** August 12-13, Tanner Park, Copiague, Long Island, N.Y. Contact (516) 661-7558.
- **6th Blue Water Celebration:** August 12-13, Pine Grove Park, Port Huron, Mich. Contact (810) 982-0891.

8th Annual Golden Pow Wow: August 12-13, Parfet Park Golden, Colo. Contact (303) 277-6651.

- **13th Annual Tyendinaga Pow Wow:** August 12-13, Morches Park, Colombia City, Ind. Contact (613) 969-1205.
- **82nd Crow Fair & Pow Wow:** August 17-20, Crow Reservation, Crow Agency, Mont. Contact (406) 638-2601.
- **25th Annual Wichita Pow Wow:** August 17-20, Wichita Tribal Complex, Anadarko, Okla. Contact (405) 247-2425 ext. 109.
- **24th Annual Chief Lookingglass "Dance under the Stars" Pow Wow & Celebration:** August 18-20, Nez Perce Reservation, Kamiah, Idaho. Contact (208) 935-2890 or (208) 935-0289 or (208) 935-0716.
- **Shakopee Mdewakanton Pow Wow:** August 18-20, Pow Wow Grounds, Prior Lake, Minn. Contact (612) 445-8900.
- **34th Annual Mille Lacs Pow Wow:** August 18-20, Iskigamizigan Pow Wow Grounds, Mille Lacs, Minn. Contact (320) 532-7518.
- **7th Annual Ponca Pow Wow:** August 18-20, Pow Wow Grounds, Niobrara, Neb. Contact (402) 857-3519.
- **Mohegan Wigwam:** August 18-20, St. Bernard's High School, Uncasville, Conn. Contact (860) 848-6100.
- **17th Annual Long Lake Cree Pow Wow:** August 18-20, Long Lake Rodeo Grounds, Long Lake, Alberta, Canada. Contact (780) 826-3333.
- **8th Annual Strengthening our Community Pow Wow:** August 18-20, 3 Mile Road, Hessel, Mich. Contact (906) 484-5026 or (906) 647-5321.
- **8th Annual Highground Warrior Pow Wow:** August 18-20, Highground, Neillsville, Wis. Contact (715) 743-4224 or (414) 384-2050.
- **18th Annual AIC Traditional Pow Wow:** August 19-20, Boone County 4-H Grounds, Lebanon, Ind. Contact (765) 482-3315.
- **44th O-Sa-Wan Pow Wow:** August 19-20, Boon City Fairgrounds, Belvidere, Ill. Contact (847) 882-1644 or (708) 877-8563.
- **8th Santa Rosa Pow Wow:** August 19-20, Sonoma County Fairgrounds, Santa Rosa, Calif. Contact (707) 869-8233.
- **Rocky River Rendezvous and Two Worlds Pow Wow:** August 19-20, Memory Isle Park, Three Rivers, Mich. Contact (616) 344-7111 or (616) 279-9069.
- **Dawnland Center Intertribal Pow Wow:** August 19-20, Parkers Farm, Montpelier, Vt. Contact (802) 229-0601.
- **Ojibwa Keeshigun Pow Wow:** August 19-20, Old Fort William, Thunder Bay, Ontario, Canada. Contact (807) 473-2344.
- **7th Annual Whitefish River Pow Wow:** August 19-20, Sunshine Alley, Birch Island, Ontario, Canada. Contact (705) 285-4321.
- **8th Spirit of Wovoka Days:** August 25-27, Joe Parr Sports Complex, Yerington, Nev. Contact (775) 463-2320 or (775) 463-2350.
- **32nd Southern California Pow Wow:** August 25-27, Orange County Fairgrounds, Costa Mesa, Calif. Contact (714) 663-1102.
- **3rd Rapid River Anishnabeg Pow Wow:** August 25-27, Hiawatha Forest, Rapid River, Mich. Contact (906) 474-9910.

Kul-Wicasa Oyate Fair & Wacipi - 1999

- **Free the Children Spring Pow Wow:** August 26-27, Timberlake Campground, S. 40th St., Climax, Mich. Contact (616) 565-0525 or (616) 979-5621.
- **Fresh Meadows Pow Wow:** August 26-27, Alley Pond Park, Fresh Meadows, N.Y. Contact (212) 666-9478 or (516) 292-9447.

Minneapolis Community
and Technical College &
United Nations of Indian Tribes
for Education (U.N.I.T.E.)

Student organization invites
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**Second Annual
Pow wow**

Friday, April 28th, 2000
Minneapolis Community and Technical College
1501 Hennepin Ave. S. • Minneapolis, MN 55403

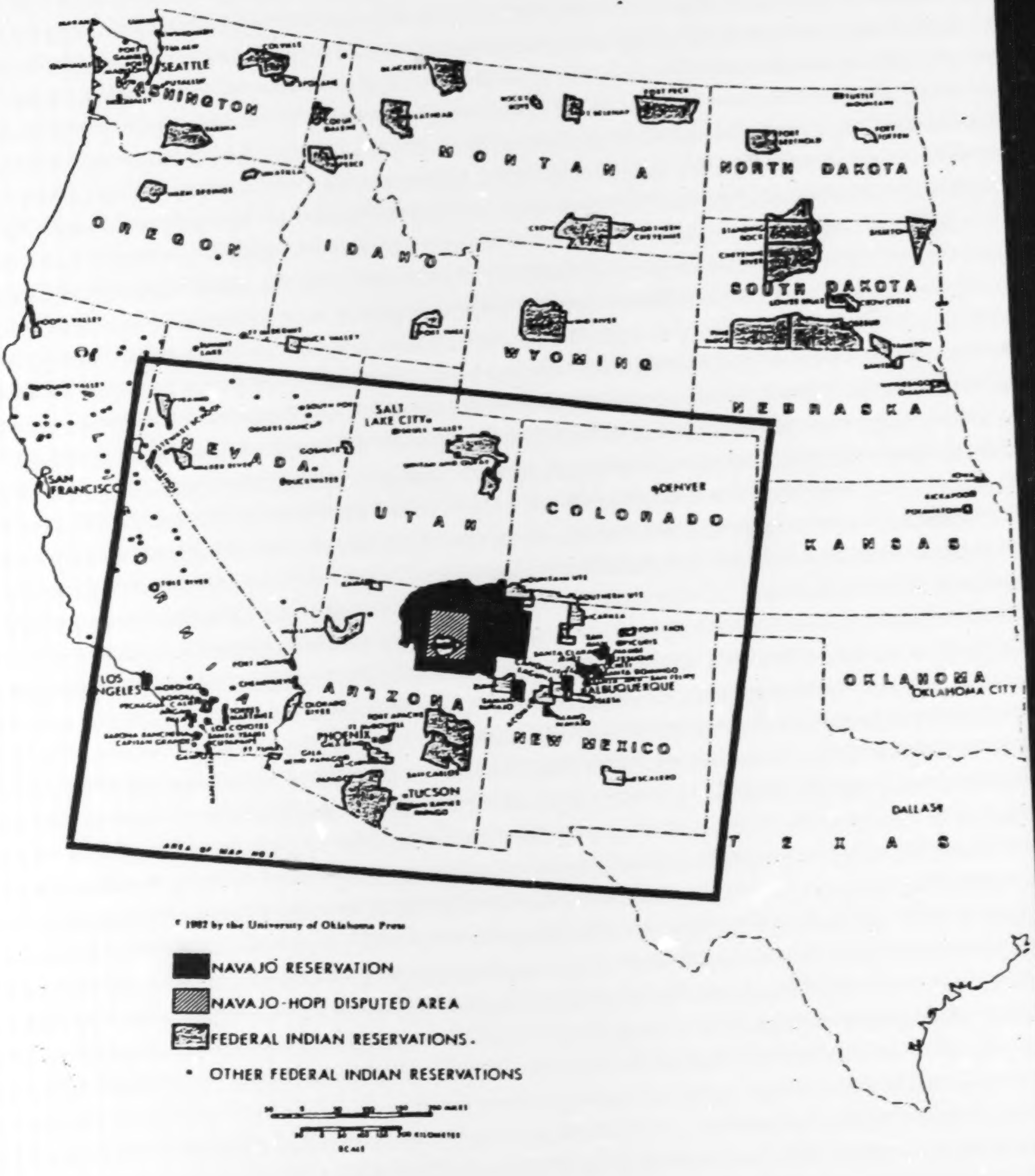
Time: 1:00 and 7:00 p.m.

Admission: $2.00
$1.00 discount for a donation of school supplies

Contest Specials: TBA

For info. call Renee Beaulieu-Banks at (612) 341-7064

Sponsors to date are: Minneapolis Community Technical College, Shakopee/Mdewakanton Community, Leech lake Tribal Council, St. Croix Tribal Council and White Earth Tribal Council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ARIZONA
OKLAHOMA
OKLAHOMA CITY
PHOENIX
ALBUQUERQUE
NEW MEXICO
TUCSON
DALLAS
TEXAS
AREA OF MAP NO. 1
NAVAJO RESERVATION
NAVAJO-HOPI DISPUTED AREA
FEDERAL INDIAN RESERVATIONS.
OTHER FEDERAL INDIAN RESERVATIONS
SCALE

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EVALUATION:

1. Check student's work for accuracy on both estimation and exact calculation.
2. Ask to find the shortest route home.

RESOURCES:

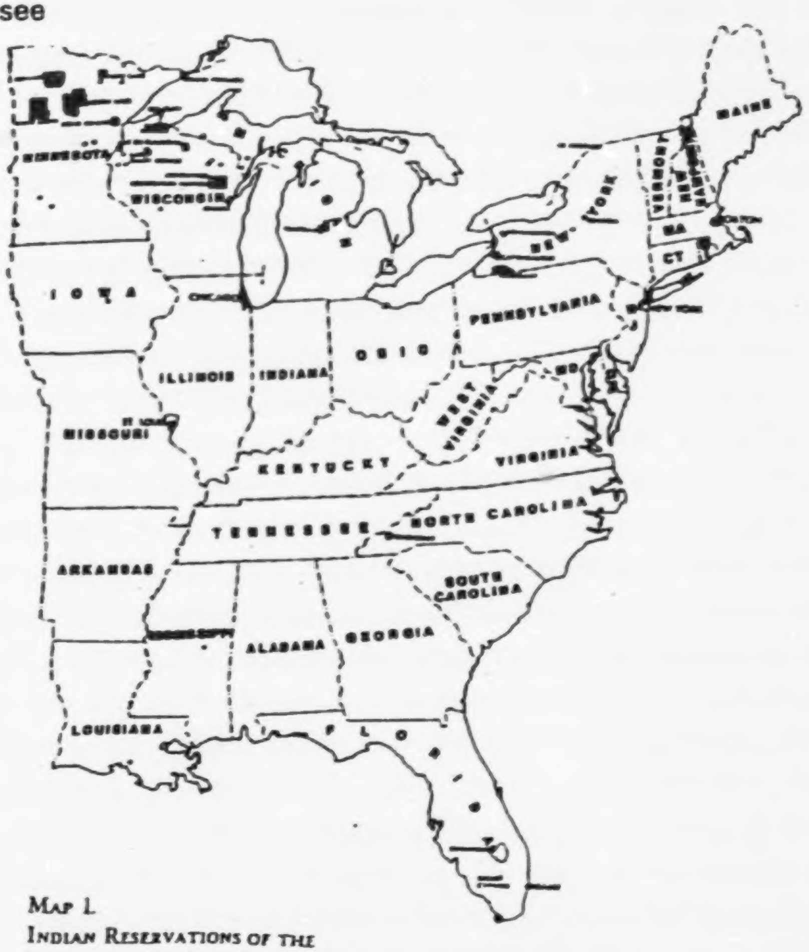
Webster's New International Dictionary. 2nd Edition Unabridged. G. & C. Merriam Company. Springfield, Massachusetts:

Hammond's Ambassador World Atlas. C.S. Hammond and Company. Maplewood, New Jersey: p. 124-Political.

James M. Goodman. The Navajo Atlas. University of Oklahoma Press. Norman, Oklahoma: "Indian Map/Indian Reservations of the Continental United States."

DEVELOPED BY:

Frances Wabaunsee
David White
Grover Parsons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FLORIDA

MAP 1.
INDIAN RESERVATIONS OF THE
CONTERMINOUS UNITED STATES

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SCIENCE --

"MARIA TALLCHIEF: DANCER WITH A DREAM"

CULTURAL OUTCOME: IX
SCIENCE OUTCOME: III

CULTURAL OBJECTIVE:

Students will determine that good health habits and a positive mental attitude are vital to create happy, healthy Indian lifestyles.

SCIENCE OBJECTIVES:

Students will:

identify and practice good health habits

understand the effects of eating nutritional foods.

TEACHER'S BACKGROUND INFORMATION:

"MARIA TALL CHIEF"

Betty Marie Tall Chief wanted to be a ballerina, but not just an ordinary ballerina. She wanted to be a prima ballerina--a star. She knew it wouldn't be easy to achieve her dream. It would take determination, hard work, and sacrifice. But when she was a little girl dreaming of future greatness, she could not have imagined how hard it would be to achieve.

Betty Marie Tall Chief was born in Fairfax, Oklahoma, in 1925 to an Osage father and a Scots-Irish-Dutch mother. When she was eight years old, her father moved the family to Los Angeles. There, Betty Marie and her younger sister, Marjorie, were enrolled in music and ballet lessons. Ballet is not easy. It means many hours of practice, of painful bending and twisting and stretching. It means repeating the same turn, the same step, over and over and over until your body aches and you want to cry with exhaustion. It means missing movies and parties, and hearing the sounds of your friends' laughter through the open window while you practice and practice and practice. It means going without something that you want so you can buy new ballet shoes. Only the most determined succeed.

In 1941, when Betty Marie was seventeen, she was asked to join the great dance company Ballet Russe de Monte Carlo on its 1941 Canadian tour. She was no longer a student, but a professional. Of course, she would not start out as a prima ballerina; that would take many months, even years, of work. At first she would only be a member of the corps de ballet. Her name would appear in small print in the program, if indeed it was printed at all. Yet this was the first step, the first chance she would have to learn what the life of a professional dancer was like. Dizzy with excitement, and at the same time a little frightened and lonely, she said goodbye to her parents and sister and left with the Ballet Russe for Canada.

Betty worked harder than she had ever worked in her life. She practiced the simplest steps over and over and over. Her every day was filled with work. There were rehearsals, and fittings for costumes, and more rehearsals, meals eaten on the run, only very short moments of rest, and then more rehearsals. She worked longer, practiced harder, and put more effort into learning each part than any other dancer. She learned quickly.

One night just before the curtain was to rise on a performance, Betty Marie was told that she would dance a small part in the ballet Gaite Parisienne. This part called for her to do a series of fouettes, which involved whipping kickouts performed with one raised leg while at the same time balancing and spinning on one toe. She was wonderful, so wonderful that when she was finished, the audience clapped and cheered, and the principal dancers--including Danilova, the star of the ballet praised her. After that she was given other good parts. She never knew until the last minute what role she would dance. Sometimes she'd be dressed and ready for one role and would have to change into a very different costume. It didn't matter because she was always prepared.

One night a soloist did not show up, and once again, Betty Marie had to change costumes and get ready for a different role. She was hardly changed and the new costume barely fastened when she was back on stage, dancing alone in front of the audience.

There was a party after the ballet. Mia Slavenska, one of the dancers, approached Betty Marie. "You're ready for greater roles," she told Betty. "You've earned them. But there's a problem. You'll have to change your name. Mr. Denhen wants you to have a new name--a Russian name, to go with the image of the Ballet Russe."

For the first time in her life, Betty Marie found something that was more important to her than dancing. "Never!" she said. "I will not change my last name! It is a good Indian name and I am proud of it. I'm not Russian. I'll change my first name. I'll be Maria if you want me to, but I won't let you change the way it is pronounced."

So it was decided. Betty Marie Tall Chief put aside her childhood as a dancer and became a woman. It was the beginning of the great career of Maria Tallchief, the Osage Indian dancer who would go a long, long way.

She didn't become a star right away, and because of this she was not happy. She was depressed; she couldn't eat; she grew thinner and thinner. Her body grew weak and she came down with a cold. She became very ill and had to be put in the hospital. With proper care, she eventually became well enough to return to the ballet.

She continued to perfect and polish her dancing. She practiced by herself for hours on end. She used her own money to pay for extra lessons. She grew very thin and wan, but her drive to succeed grew even stronger.

In the fall of 1942, the ballet went on tour to Los Angeles. That winter was a hard one. One after another the dancers became ill. Maria caught a cold and was unable to shake it. She danced a solo, but her spirits remained low, and her health was poor. Her mother begged her to come home and stay. But Maria said "no." In April, even though she was very ill, she went on tour with the company.

One night Maria fainted at a party. She begged her friends to say nothing to her mother. She again had to be put into the hospital. The doctors again told her how important it was to take good care of her body. "You must get enough rest. You must eat the right foods to keep your body in good physical condition," the doctor told her. Then Maria knew that she must always eat the right kinds of food to make her strong and healthy. She realized just how important it was to get proper rest.

As time passed, Maria danced the lead roles and became the star of the ballet. Her sunken cheeks filled out and color returned to her pale face. Her New York debut was outstanding,and no one could question her role as a dancer. As she stood with the other dancers to accept the cheers of the audience, her eyes filled with tears. She saw the audience rise. She heard their shouts and applause. She saw bouquets of flowers being brought to the stage. Her arms were filled with flowers.

For Maria Tallchief, life would never be the same again.

STUDENT LEARNING ACTIVITIES:

1. Have students discuss what might have happened if Maria had not had the courage to continue her dancing. How did dancing keep her body "physically fit?"

2. Discuss how eating the right foods keeps one healthy.

3. Have the class name ways that the body can break down. Name some diseases or illnesses that we can get by poor nutrition. Discuss problems that are common to certain lifestyles. (Smoking, drinking, fat consumption). What medicines can you take? How did the early Native Americans treat illnesses?

4. Have local athletes speak to the class about how good health habits helped them achieve their goals and how they overcame any health problems that they might have had.

EVALUATION ACTIVITIES:

1. Have each student choose a 3 x 5 card on which has been printed a body part - leg, arm, heart, etc. Lay a large sheet of newsprint on the floor and give students 10 minutes to complete a picture and label body parts.

2. Have a short quiz over the effects of good and poor nutrition.

3. Have students predict what might happen if there had been no doctors to care for Maria.

4. Have students predict what might have happened if Maria had let the boss change her name.

RESOURCES:

Information about Maria Tall Chief was supplied by conference on "A Gender Equity Curriculum for Grades 6 - 12," Tahlequah, Oklahoma, 1991.

DEVELOPED BY:

Jeri Stevens

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Caretakers of the Earth

Martha Gould-Lehe

Eskimos of Yesterday and Today

The word Eskimo means "eaters of raw meat." It is an Algongquin word and was a name given by outsiders. People of this north polar region do not traditionally call themselves Eskimos. Depending upon their geographical location along the Alaskan coastline, they refer to themselves as Yupik, Iglulik, or Inuit.

In the past, these Alaskan natives lived almost completely off the sea and its resources. The Yupik, Iglulik, and Inuit caught fish and hunted seal, walrus, sea lion, and whale. In the summers they traveled to fish campgrounds where they put up salmon, dried meats, and picked berries. They often ate their food uncooked because Alaska's northern coastline has no trees, so firewood was rare.

Animals provided many of their needs. Animals were eaten as food. Animal fat was used as oil for lamps or as lotions. Animal furs were made into clothing, blankets, or shelter. Women tanned the animal hides and spent hours making mukluks, parkas, and snow pants. The sinew was used for thread. In the winter the Natives wore two sets of clothing. First, they put on a set with the fur side in (close to their body), then a set with the fur side out (away from their body). This double set of clothing kept them warm even in the coldest temperatures.

The natives usually lived in igloos of animal skins, wood, mud, or sod. Ice igloos were used only when they hunted or fished near the sea. Ice igloos were temporary shelters. They could be constructed in less than an hour and were invaluable when hunters were caught far from home. Entertainment in and around their homes consisted of string games, ball games, and many games of strength and endurance. Stories, songs, dances, and laughter also filled their nights. Eskimos today still enjoy traditional foods. The Eskimo people petitioned the International Whaling Commission to obtain and retain the right to keep one of their traditional lifestyle customs alive. As a result, they were granted the right to harvest a limited number of bowhead whales, a species placed on the endangered species list.

Eskimos still use dog sleds, but many more use snowmobiles for winter travel. Some Eskimos today still live off of the land. Others hold jobs in the villages or cities. Whether they choose to live life in traditional and/or modern ways, Eskimos strive to keep their proud heritage alive in song, dance, and story-telling. William Tyson represents one such storyteller who shares memories of life in the days when he was a boy.

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Reflections of William Tyson

In 1916 William Tyson was born in an Alaskan Yupik Eskimo village called Kanillik (Gung e lik). Thirty to forty people lived in the village located near the Bering Sea coast near Sheldon's Point. When William was a young man, most of Alaska's rural Indians and Eskimos lived off the land. Villagers found the land good and plentiful, and they were careful to take only what they needed.

Spring, summer, and fall were busy times for William. He and his family gathered vegetables and berries from the tundra. As a small child, William was shown wild rice, celery, herbs, and roots, which he learned to recognize and gather before the cold north wind brought snow and sub-zero temperatures. His family stored these treasures in fish or grass baskets. Other items were stored in seal or whale stomach bags.

In the spring and summer William's family watched for the beluga whales and seals that came to the Bering Sea on their northerly migration routes. The men would venture out in kayaks, always searching the sea to catch sight of these animals. When the whales were sighted, the men paddled toward them quickly. Hunting of several whales was needed to feed a village, because of the small size of the beluga. The whale fat, called blubber, and meat were part of William's diet. His family used the oil in lamps so the long, dark Arctic nights could be brightened. No part of the whale was wasted.

The seal was another mammal William's family needed. Seal fur was tanned and made into clothes. Seal fat was rendered out and the precious oil was painstakingly saved in seal bladder containers. A time without seal oil was to have a time without flavor, because the oil was used to dip dried fish in and was poured over other foods as gravy is poured over foods today. Fish gathering was a part of every season. Fish was William's main diet and still is today.

As winter came and claimed the land, William was still very busy. He had his dogs to care for, his traps to run, and furs to skin. He caught many animals like squirrels, fox, land otters, and, once in a while, a wolverine or wolf. From these animal skins, his mother made beautiful parkas and other articles of clothing. His family took some of the furs across the frozen bay to the white man's store where they traded furs for items such as knives, utensils, guns, ammunition, and blankets. They traded for very little food because they did not like the white man's food very much; however, they found many of his tools quite useful.

William was content as a young child. Season followed season. . . harvest followed harvest. Each season had offerings. The cycle of life was balanced and predictable. William and his family never took from the Earth without giving back, and they had great respect for all things. They knew they were not greater or lesser than any—just a part of it all.

In 1927, William's life changed drastically. He was sent away from home to school. It was a time of great changes. Laws were passed in far away places and many more white people moved into the area. William's people could no longer hunt whenever and for whatever they wished. Now there was something called "open season" and "closed season." It was very hard for them to understand why the caribou could no longer be killed for their potlatches

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(ceremonial feasts). The cycle of life he lived now had restrictions decided by people he didn't know.

Paper money and coins were also foreign to William. What did this paper mean? It had no place in his memory. He had no idea of how much it would buy or even how hard he should work for it. It took a long time for him to gain some understanding of money. A new people had come with new ways. The time of predictability was gone.

William stayed in his village learning the new ways until 1972, when the Alaska Native Land Claims Act was passed. In that year he went to Anchorage to work as an interpreter. He is now retired and, whenever he can, spends his time performing Eskimo dances and speaking to young people.

Today as William presents to a group of young people he tells them, "Dancing is good. It is a good way to be happy and to keep the old ways alive." He tells them how he used to make his own drum by carefully selecting a willow that had the right grain. The grain is very important because the wood has to be pliable when it is steamed and shaped into a hoop. Now drum makers use airplane fabric to stretch over the willow and twine to secure it. In the old ways a drum was made by moistening walrus or seal stomachs and stretching these over the hoop. The stomachs were then secured with sinew from the seal. As the sinew and stomach dried, they became very taut. Then when the drum was struck with various size rods, a variety of pitches would vibrate outward. William smiles as he demonstrates. "A drummer and dancer can make his own rhythm," he says, "for to the Eskimo the dance is a story of deeds or the re-enactment of a legend. The drum adds cadence to the re-telling."

After this statement, William gets quiet. His mind sees days long past. . . days that can only be demonstrated now. A lifestyle has passed and he is leaving us a legacy. No one speaks as William's downcast eyes rise to survey the young audience. "It was hard for me," he tells, "but it will not be like that for you."

He tells of a time when his parents showed him everything. They were his teachers. William smiles at the children as he tells them that his parents did not spank or hit him. "The old ones believe you always show love, because love will keep a people together. If you hit a child, the child will grow up to be angry. So that is why we don't hit children."

He pauses here, his grey head bowed, gathering time and direction before he proceeds. "Now-a-days parents don't teach their children like my parents did. They leave it to the school or the babysitters. Things are very different, and it seems to me that many young people are forgetting to respect the older people who give them knowledge. . ." His fingers tighten around the drum handle and the children wait. They seem to sense the respect that he commands.

Sometimes memories are difficult to remember. We visit places, people, and things of the past, and we know we are just visiting because time moves forward. The new becomes the old all too quickly. William looks up and with a smile strikes his drum. "When I was young, I could dance all night," he says, "but now I am old and I get tired. So, tell me what you learned today."

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He holds the drum and striker loosely in his hands as he calls on a little girl in the front, "I learned it is important to show respect," she says.

"And to show love so people won't become angry," adds her friend.

William points to a boy in the back row, "Let's see what you heard today."

"I learned that we need to have people like you to teach us, so that the old ways won't be gone forever," the boy answers seriously.

"Good! You have all been excellent listeners. Now remember what you heard today, and teach it to others."

William holds up his drum in a kind of salute as the students stand and file pass, thanking him for his time and information. The presentation is over. William has instilled a sense of the Eskimo way of life in a much younger generation, a generation that can only see his memories in museums, film documentaries. . . and through his words and deeds.

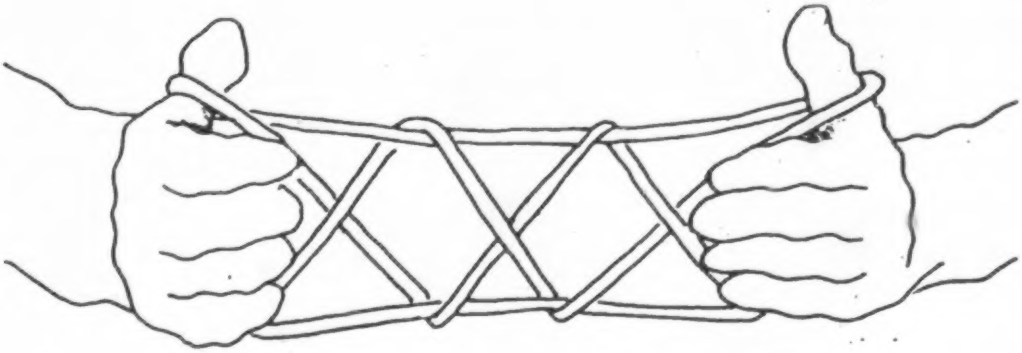

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Illustration:

String game known as: *Two Diamonds* by Osage
Twin Stars by Navajo
Lightning by Zuni
Diamonds and Turtles in Caroline Islands
One form of Navajo *Storm Clouds*
Sixth move of Alaskan string game, *The Mouth*

The same pattern is also found in Hawaii and New Guinea with a similar pattern of *Cat's Cradle* made by the Australian aborigines.

Discussion Questions:

1. Why do you think William Tyson is invited to speak and perform in schools now, but he was not allowed to practice his culture as a child?
2. If you could go back and meet William as a child, what sort of things would you like him to show you? What questions would you ask him?
3. How does William feel children should be treated? Does he imply that children are treated differently today than when he was a child?
4. What did William and his family use as valued items for trade?
5. Why do you think the Eskimo people were always careful not to take too much from their environment?
6. Could people today learn from William's family? If so, what?

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LESSON PLANS/SCHEDULE FOR MUSIC AND DANCE UNIT:

My Ideas for Music and Dance Unit:

ADDITIONAL RESOURCES

Indian ABC Books

Many Nations: An Alphabet Book of Native America by Joseph Bruchac (Indian Author), Troll, 1998.

Cherokee ABC Coloring Book by Daniel Pennington, Book Publishing Co., P.O. Box 99, Summertown, TN 38483

ABC's of Our Spiritual Connection by Kim Soo Goodtrack (Indian Author), Theytus Books.

ABC's, the American Indian Way by Richard Red Hawk (Indian Author), Scb Distributors, 1992.

The Path of the Quiet Elk, A Native American Alphabet Book by Virginia Stroud (Indian Author), Dial, 1996.

Navajo ABC, A Dine Alphabet Book by Luci Tapahonso (Indian Author), Aladdin, 1999.

Powwow ABC by Sandy Hummingbird, 2000.

Where to Get Books

North American Native Authors Catalog, Greenfield Review Press, P.O. Box 308, Greenfield Center, NY 12833 (518) 583-1440 http://nativeauthors.com

AISES Books Catalog, American Indian Science and Engineering Society (505) 765-1052 www.aises.org

Indian Books Catalog, Four Winds Indian Books, P.O. Box 544, York, NE 68467-0544 (402) 362-5654 http://www.fourwindsbooks.com

Amazon.com Bookstore and bookcenter@nativeweb.org All selections are linked directly to Amazon.com bookstore so that you may purchase them online at a discount.

Prairie Edge Book and Music List, Prairie Edge, 6th & Main, Rapid City, SD 57701 (800) 541-2388 prairie@rapidnet.com www.prairieedge.com

Medicine Root Inc., Native Earth Products of North America, P.O. Box 353, Louisville, Colorado 80027 (303) 661-9819 Fax (303) 664-5139

The Native Book Centre, 150 York Hill Blvd., Thornhill, Ontario, Canada L4J 2P6 (905) 881-7804 Fax (905) 881-7808 http://www.9to5.com/9to5/NBC/

BOOKS AVAILABLE FROM THE HASKELL FOUNDATION

Hen of Wahpeton by Ann Nolan Clark $8.00

Little Herder in Spring, Little Herder in Summer, Little Herder in Autum, Little Herder in Winter by Ann Nolan Clark 4 books for $25.00, 1 $8.00

There Still Are Buffalo by Ann Nolan Clark $7.00

Coyote Tales by William Morgan $8.00

Who Wants To Be A Prairie Dog? by Ann Nolan Clark $7.00

Slim Butte Raccoon by Ann Nolan Clark $7.00

Young Hunter of Picuris by Ann Nolan Clark $6.00

Little Turtle by Hildegard Thompson $4.00

Little Hopi by Edward A. Kennard $8.00

Little Boy With Three Names by Ann Nolan Clark $8.00

Bringer of the Mystery Dog by Ann Nolan Clark $8.00

Billy Black Lamb by Caroline H. Breedlove $4.00

Field Mouse Goes To War by Edward A. Kennard $8.00

Grass Mountain Mouse by Ann Nolan Clark $8.00

Little Man's Family, Books One and Two $5.00 and $7.00

Navajo Life Series by Hildegard Thompson $4.00

Sun Journey by Ann Nolan Clark $7.00

This Little Books series of children's books was commissioned by the Bureau of Indian Affairs in the 30's, 40's and 50's. They have influenced and entertained several generations of Indian children.

To place an order for the Little Books, call 785/749-8417 or 8425. Shipping and handling extra. The Haskell Foundation, 155 Indian Avenue, Lawrence, KS 66046.

Science Organizations and Projects

American Indian Science and Engineering Society, P.O. Box 9828, Albuquerque, NM 87119-9828 Publishes Winds of Change Magazine. (505) 765-1052 www.aises.org

Four Directions Project involves science, math and technology for Bureau of Indian Affairs funded schools, Pueblo of Laguna, Laguna, NM. www.4directions.org

Science Through Native American Eyes, Cradleboard Teaching Project, Nihewan Foundation for American Indian Education, founded by Buffy Sainte-Marie. Interactive Multimedia CD Rom for grades 5-adult. www.cradleboard.org

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